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NEW ANÆSTHETIC DRUGS*

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DESPITE the title of this paper I shall tell you at once that I have no announcement to make of any revolutionary new agent. Nothing introduced into anæsthesiology during the last five years appears to be of more importance than a new variation of already available agents. For this reason one could hardly use such a title as "Recent Advances" or "Better Anæsthetic Agents".

Perhaps I should have called the paper "Changing Aspects of Anæsthesiology". There is no denying the multiplicity of agents now available to the anæsthetist, and the bewildering array of apparatus and methods of administration. This complexity has brought new problems and new dangers, as well as certain advantages. All too often we still hear about tragic anæsthetic accidents; and there is a widespread awareness that every anæsthetic procedure means for the patient a journey "through the valley of the shadow of death". Modern anæsthesia, because it can be rapidly and easily induced, and because most of its unpleasantness has been removed, seems simple in the hands of an expert. But for the inexperienced anæsthetist this very ease of induction may be only a snare and a delusion. There was never a better example of the truth of the maxim "eternal vigilance is the price of safety"—and vigilance must here be fortified by knowledge and much common sense.

For this reason, the most important trend in anæsthesiology is toward better qualified anæsthetists. It seems to me that, for years to come, a comprehensive teaching program will be the most urgent duty of the leaders of the specialty. I do not mean that every doctor who ever administers an anæsthetic must be a certified specialist; but just because the choice of anæsthetic agents and methods is now so complex, every doctor should know at least what to be afraid of, and how to get out of common difficulties. Short courses for general practitioners, as well as more formal and systematic training for hospital anæsthetists, will save the lives of many who would otherwise die under anæsthesia.

Now let us briefly review the galaxy of anæsthetic agents. The gases—nitrous oxide, ethylene and cyclopropane—retain a preeminent place in modern practice. Gas has the great advantage that the depth of anæsthesia can be readily controlled, and instant changes of concentration made to suit the requirements of individual patients. None of these gases is irritating, and elimination is effected rapidly—almost entirely through the respiratory tract. For these reasons we see nothing which is likely to take the place of the gases for routine surgical anæsthesia. The introduction of curare has permitted a much wider and safer use of nitrous oxide than was formerly possible. Ethylene, after some years of partial eclipse, is now coming back into use for particularly poor risk patients because it has so little toxicity for heart or viscera. Cyclopropane, because of its versatility, potency, and controllability remains for me, and for many other anæsthetists, the "work horse" of the operating room, useful in every case where there is not a special reason to use some other agent.

Pentothal (thiopentone) continues to be the most popular intravenous anæsthetic agent. Nembutal, kemithal, and surital are other barbituric acid derivatives which have their advocates for intravenous use. We have tried them all, and from the clinical point of view we have failed to note either marked advantages or disadvantages when compared with the commonly used pentothal. In a recent article Hebrich, Papper, and Rovenstine[1] state that surital sodium may be superior to similar drugs in current popular use in respect to rapidity of

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awakening from a comparable plane of anæsthesia, less frequent circulatory depression, more rapid restoration of spontaneous breathing after large doses, and in the more benign nature of laryngospasm sometimes produced.

In my opinion, the dangers encountered with these newer barbiturates are similar to those with which we have grown familiar when using pentothal, and the same kind of safeguards must be enforced. Intravenous barbiturates are wonderful sleep producers, but not good analgesics or relaxants. They may be used safely and with great satisfaction to the patient when given in appropriate dosage for the induction of anæsthesia. Whenever the surgical procedure is to take longer than a very few minutes, some provision should be made to continue the anæsthetic by the addition of some other analgesic drug. To expect any of the barbiturates to take care of all the anæsthesia required for a long painful operation means that we run serious danger of overdosage, with delayed recovery, and in poor risk cases a possibility of barbiturate poisoning. Safety with the barbiturates lies in using small total dosage, dilute solutions (never stronger than 2½% with pentothal or surital) in maintaining a free airway, and in always having at hand some way of supporting respiration. If such precautions are taken, intravenous anæsthesia is a great blessing to our patients. If the safeguards are disregarded, the very ease with which this kind of anæsthesia may be induced makes it a dangerous menace.

When we turn to the field of regional anæsthesia we find ourselves with a choice of literally hundreds of local anæsthetic agents which have at some time or other been used in clinical practice. For the ordinary clinician it is wise to understand three or four of these agents, use them for indicated purposes, and forget all the rest. Time has now proved the value of cocaine, procaine, nupercaine, pontocaine and metycaine, each with its own advantages for particular situations.

An interesting new local anæsthetic is xylocaine, introduced by Logfren[2] of Sweden in 1948, tested clinically by Torsten Gordh,[3] and reported on in 1949 by Hanson and Hingson,[4] of Johns Hopkins, who state that it is "the most promising of the new local anæsthetics, approaching in efficiency the nerve blocking properties of metycaine and in toxicity the advantages of safety presented by procaine." Chemically, xylocaine is diethylamino-2-6-dimethylacetanilide.

Spinal anæsthesia, at least in our part of the world, is increasing in popularity. I believe this is because there is a better appreciation of the safety factors which should accompany this procedure, and a more intelligent attempt to select our cases, to individualize dosage, and to combine it with sleeping doses of general anæsthetics. Meticulous attention to aseptic technique, the use of fine lumbar puncture needles, minimal dosage and dilute solutions of the drug, and an understanding psychological approach to the patient are the factors to which we attribute our satisfactory record in the use of spinal anæsthesia for both surgical and obstetrical cases.

Continuous caudal anæsthesia, on account of its comparatively complicated technique and its potential dangers, has practically disappeared from routine use in Canada. To lengthen the duration of single dose spinal anæsthetics, the addition of proper quantities of epinephrin, ephedrine, or neo-synephrin to the anæsthetic drug appears to be an effective and safe procedure.

New analeptic drugs are frequently appearing on the market, some with vasopressor action and some with cerebral stimulatory effect. An interesting newcomer is soduxin, advocated on account of the part played by succinic acid in the oxidation metabolism of cerebral cells. Barrett[5] reported that the intravenous injection of 10 to 60 c.c. of 30% sodium succinate solution shortened the period of sleep after anæsthesia, and could be used as a cerebral stimulant in cases of barbiturate poisoning. We have used this drug in a fairly large number of cases, and we find that although it does have some stimulating effect on respiration it is disappointingly ineffective even when given in large doses to patients who are deeply narcotized.

A very promising new vasopressor drug is the British preparation vasoxyl, or methoxamine hydrochloride.[6] This drug is said to have a long-acting pure vasopressor effect, without producing cerebral stimulation or other side effects. It can be used to overcome hypotension during spinal anæsthesia, and to raise blood pressure whenever such an effect is required. Like neo-synephrine, it may be used during cyclopropane or chloroform anæsthesia, for it

has no effect on cardiac autonomaticity other than a tendency to slow the heart. It is said to have a longer action than a dose of neosynephrin with corresponding vasopressor effect, and may be given either intravenously or intramuscularly. A clinical and laboratory study of vasoxyl is now under way in the Department of Anæsthesia at McGill University, and all I am prepared to report at the moment is that the drug appears to be clinically effective, and safe when used in moderately sized doses.

Intravenous procaine continues to have a useful application in many fields of therapy, but this drug has not turned out to be quite the miracle worker which it seemed to be a few years ago. It certainly has very little place as a general anæsthetic agent, but it does have a valuable effect in protecting the heart from irregularities during cyclopropane anæsthesia. Procaine is given intravenously to relieve pain in arthritis, and to facilitate manipulation by the physiotherapist. It can be given to control the pain of burns and for postoperative distress, although personally I have been disappointed in what I have seen it accomplish in this field.

As a postoperative sedative in patients who do not react well to morphine or other analgesics, I have been impressed by the efficacy of intravenous ethyl alcohol, given slowly in 5% solution. In the average patient 1,000 c.c. of this solution (50 c.c. of pure alcohol) by slow drip will give a sense of well-being without inebriation—just a "lift" to tide over a difficult period. We use intravenous alcohol also for obstetrical patients during long-drawn-out first stage labour. It seems to be preferable at times to any of the ordinary analgesics or sedatives.

Many synthetic analgesic drugs have been reported in recent medical literature. There is a continuing search for some drug which will have a pure analgesic action, without the side effects of the opiates. We are familiar with demerol, methadon and dilaudid. Other compounds have been given a clinical trial by pharmaceutical manufacturers. None of these new drugs is entirely free from the disadvantages of morphine. In Canada, the Narcotic Division of the Department of National Health has been much concerned about the habit-forming properties of these new easily manufactured and potentially cheap analgesic drugs, and they fear a great increase in drug addiction if these substances are easily available. It seems wise for medical practitioners to restrain their enthusiasm for the new analgesics until more is known about their possibly harmful properties.

Trichlorethylene is an anæsthetic which is not exactly new, but which has created much interest recently in Great Britain and in Canada. It is a heavy, moderately volatile liquid, which when administered by inhalation with air or oxygen, in a concentration of 0.5 to 2.5% has anæsthetic properties. It is a potent analgesic, but not very efficient as a muscle relaxant. It has been shown that good analgesia may be produced with extremely small quantities of the drug, and also that high concentrations inhaled over a long period may induce an alarming tachypnœa and other harmful effects. It is unsuitable for administration by open drop or by soda lime absorption techniques, and therefore many special inhalers have been devised for its use. One of the latest of these, designed for the Department of Anæsthesia of McGill University, by Asquith and Gilbert, is proving to be very satisfactory. Because of its analgesic properties, trichlorethylene (or trilene) is useful in obstetrics. When given in properly controlled concentration it does not interfere with the course of labour or the condition of the baby. In Great Britain it has been considered safe enough to be made available for use by midwives. I do not believe trichlorethylene will fill a very large place in Canadian hospital anæsthesiology, where we have all sorts of other agents to use; but it certainly should be available for special occasions.

It is now more than eight years since curare was first used in clinical anæsthesia.* The introduction of a pure muscle relaxant has had a truly revolutionary effect on the whole practice of surgery. Curare is now used more or less routinely in almost every operating room in the civilized world, and reports about it in medical literature may be numbered in the hundreds. Generally speaking, its story is one of efficiency and safety, although as may be expected with such a potent drug, there have been accidents and tragedies connected with its use. In my own experience d-tubocurarine chloride, the active principle of curare, when

* At the Homœopathic Hospital of Montreal on January 16, 1942.[7]

carefully used, has been so satisfactory that I wish no other relaxant drugs had appeared to complicate the picture. However, I suppose it was only natural that as soon as the principle was established of using a relaxant drug in anæsthesia, pharmacologists should begin a more or less frantic search for curare substitutes. This has resulted now in a chaos of claims for the superior properties of various drugs, including many different brands of d-tubocurarine and other curare variants; and several synthetic relaxants which are related physiologically and pharmacologically, but not chemically, to curare. There are metubine and other brands of dimethyl ether d-tubocurarine, and myanesin and flaxedil; and syncurine and other brands of decamethonium bromide. These preparations, except myanesin, seem to act at the myoneural junction in a manner somewhat similar to curare, but there is wide variation of the weight dosage required to produce completely relaxed muscle under the same degree and kind of anæsthesia. Dr. W. G. Cullen and I have just completed a clinical study of 600 patients receiving one or more doses of decamethonium ("C.10" or syncurine). We have come to the conclusion that this drug can be used in the same way and for the same type of cases as d-tubocurarine, and that it has neither very striking advantages nor disadvantages. Probably the same can be said for the methylated curares and for flaxedil.

For some of these preparations their promoters have made claims for greater safety on the grounds of less respiratory depression, selective action on abdominal muscles, less danger of atelectasis, or some other observation made on laboratory animals. Our experience in the operating room has led us to believe that there is no justification for such statements. Clinical safety with all the muscle relaxants depends on common sense in dosage, proper attention to the depth of anæsthesia, and to adequate control of respiration. If these factors are expertly handled, I would not care whether an anæsthetist gave me intocostrin, metubine, syncurine or flaxedil. The only possible advantage of the synthetic preparations over the well-established brands of curare is that in an allergic patient there is perhaps less likelihood of a histamine-like reaction. To get a true picture of the comparative clinical action of closely similar drugs one should standardize variable factors, which in the operating room may be of great complexity, and then make a statistically accurate and completely objective report on the findings. This is a most difficult project, and much that is reported about new drugs is based on conjecture, or impressions, rather than on real scientific observation and analysis.

In a report about new anæsthetic drugs, I feel I cannot conclude without a word about the present status of the oldest of all the anæsthetic agents—ethyl ether. Ether is unpleasant, it is irritating, it is toxic, and it is explosive. In my own hospital even the smell of ether has disappeared. And yet ether has one supreme advantage as an anæsthetic agent—it does not depress respiration. Even though a patient may splutter and kick and get full of mucus, he still breathes. For this reason it is my firm conviction that unless a doctor makes himself familiar with the methods of controlling respiration, and has available the necessary apparatus, he should not be tempted into using the new easily administered anæsthetics, and he should make old-fashioned ether the mainstay of his anæsthetic practice. Thus may be avoided some of the tragic accidents which result from ignorance.

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RÉSUMÉ

L'auteur prévient le lecteur qu'il ne s'agit pas de découvertes extraordinaires mais plutot d'une application nouvelle des mêmes médicaments et de l'emploi de quelques nouveaux produits. La chose la plus importante actuellement est de former de bons anesthésistes. L'anesthésie au gaz à cause de son maniement facile n'est pas prête de perdre sa place surtout depuis qu'on se sert due curare comme adjuvant. Le pentothal est encore l'anesthésie intraveineux de choix. Le nembutal, le surital et le kemital n'ont pas semblé présenter d'avantages marqués.

Parmi les nouveaux analeptiques, la soduxine qui aurait une action sur l'oxydation des cellules cérébrales n'a pas donné les résultats que l'on attendait chez les patients profondément endormis. Un nouveau vaso-constricteur le vasoxyl posséde un effet hypertenseur sans stimulation des cellules cérébrales. Ce médicament est actuellement à l'étude. La procaine intra-veineuse d'après l'expérience de l'auteur possède une valeur moindre que celle qu'on lui avait attribuée au début. Comme sédatif post-opératoire l'auteur préfère l'alcool intra-veineux. Tous les nouveaux narcotiques possèdent certains des désavantages de la morphine. Le trichloréthylène est un analgésique puissant mais ne relâche pas la musculature. Actuellement on essaie de découvrir des curarisants de synthèse. Tous ont à peu près une valeur égale et tout dépend de celui qui administre le médicament. L'auteur n'emploie pas l'éther mais il est d'avis que c'est encore l'anesthésique de choix pour celui qui n'est pas expérimenté.

YVES PRÉVOST

COMMISSUROTOMY IN MITRAL STENOSIS*

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FOR the past twenty-five years and especially over the past two or three years, many operative techniques have been tried with a view of surgically treating mitral stenosis. Amongst the most familiar of the techniques are the pulmonary vein to azygos vein shunt; ligature of the inferior vena cava; section of the tricuspid valve by way of the jugular vein; manual dilatation of the mitral opening; valvulotomy; valvuloplasty; and finally the one that we wish to present here, commissurotomy. This latter technique was first applied clinically by Bailey, Glover and O'Neill[1] of Philadelphia. Their experiences in the past two and a half years in carrying out this operation in 48 cases with a quite reasonable operative mortality and what appears to us to be good results,[2] encouraged us to try out the procedure.

The reasons advanced by the authors of the technique for the preference over preceding operative approaches to the mitral valve seemed logical, inasmuch as previous surgical attempts had all been concerned with creating regurgitation at the mitral orifice to remedy the mitral stenosis.

Digital dilatation of the stenotic orifice was first practised by Souttar[3] in 1925, with success in one case. Bailey and his associates using the same digital dilatation had one success in three attempts.[4] It is readily understood that with simple digital dilatation of the mitral valve one cannot be sure that the tears will appear at the proper place, as the ring will reasonably always rupture at the weakest point. Should the tears occur at one of the commissures, the length of the openings cannot be controlled and may well be inadequate.

Simple incision of a valve cusp as done by Cutler[5] frequently leaves the valve unchanged or if the incision is prolonged through scar tissue and involves the cusp there is fatal regurgitation, especially if the incision involves the antero-medial or aortic cusp.

Another surgical procedure consisted in excision of a portion of the mitral ring as practised by Cutler and Beck,[6] Pribram[7] and Smithy.[8] This excision is only mentioned to be condemned in our mind as being practically certain to occasion regurgitation.

Valvuloplasty was described by Harken,[9] in which portions of the stenotic valve ring were excised, but at the commissures. The objections to this procedure stem from the difficulties of proper localization of the commissures by palpation with the valvulotome. Another kind of ingenious valvuloplasty using a venous graft has recently been reported by Murray.[10] This procedure would seem to require greater technical skill than we possess.

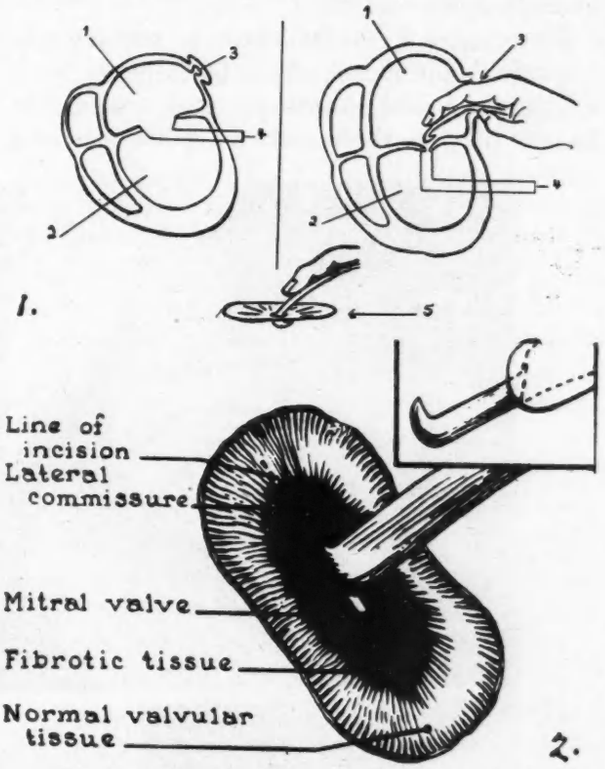

Fig. 1.—Left, normal heart; right, mitral stenosis. (1) left auricle; (2) left ventricle; (3) auricular appendage; (4) mitral valve; (5) close-up of valve with knife in place. **Fig. 2.**—Diagrammatic representation of knife cutting along line of lateral commissure. (Reproduced from C. P. Bailey, *et al., J. Thoracic Surg.*, **19:** 16, 1950.)

The most logical procedure therefore, to our mind, was the procedure suggested by Bailey[11] and termed commissurotomy. This operation has the advantage of direct finger approach and palpation of the mitral valve (Fig. 1). The exploring finger can then guide a specially designed knife to the stenotic orifice and incisions are made according to the lines of the lateral and (if necessary) medial commissures (Fig. 2). One would immediately think that the stenosis would tend to recur. This however, does not seem to be the case as demon-

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strated experimentally in the dog by Bailey and later in man. We believe that there are two reasons for the commissures to stay open once they are sectioned; firstly, the section is made in sclerotic tissue in which there are very few blood vessels and therefore little bleeding follows section. As sclerosis develops following wounds in tissue that is well vascularized, it would appear theoretically that the stenotic mitral ring should not fuse again. A second and possibly more important reason is that the cut edges are kept apart by the pressures at the mitral opening and therefore do not tend to come together and unite.

The approach to the valve is through the auricular appendage which lends itself very adequately to the procedure. It is rather fortunate that in these cases of mitral stenosis there is usually a tremendous dilatation of the left auricle and the left auricular appendage to at least twice the size of a normal. This fact has been established by personal observation on autopsy specimens. Moreover the auricular appendage is easily accessible, eliminates entanglement in the chordæ tendineæ, and affords easy palpation of the valve and access to it without gross hæmorrhage. The original operation as advocated by Bailey[11] was through a submammary anterior incision of the left side. We have felt that the approach was easier through the left postero-lateral route, for in this fashion the heart was not disturbed throughout most of the procedure and one could reach the appendage without dislocating the heart.

All our cases therefore have been done through a left postero-lateral incision. The

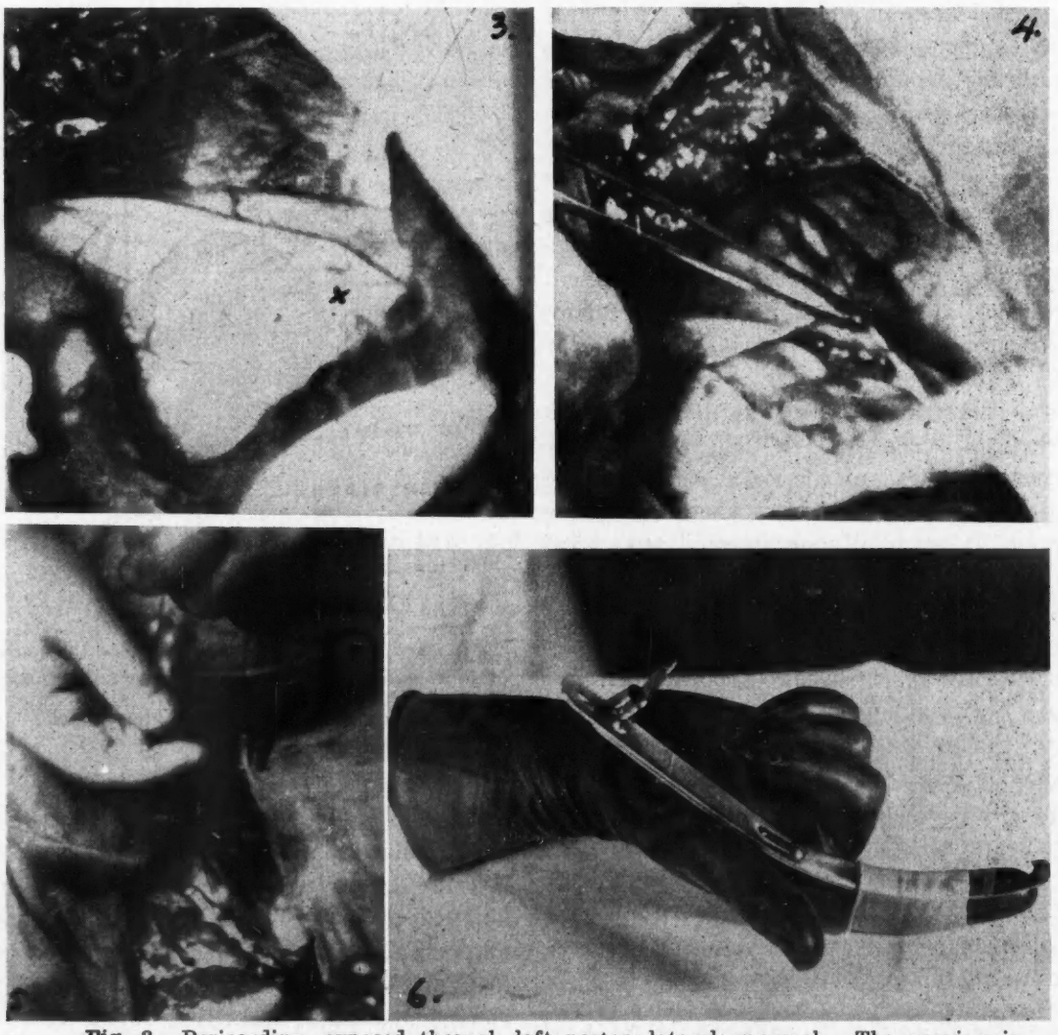

Fig. 3.—Pericardium exposed through left postero-lateral approach. The opening is made posterior to the phrenic nerve (x in illustration). **Fig. 4.**—Exposed auricular appendage. The anterior leaflet of pericardium is being held up. **Fig. 5.**—Purse-string inserted and held by assistant. Non-crushing clamp applied and tip of appendage amputated preparatory to insertion of finger. **Fig. 6.**—The knife held in place by a finger cot with tip amputated. The guillotine is here seen open.

fifth rib is resected and the fourth and sixth ribs are transected at the posterior angles, the pleura being opened through the bed of the fifth rib (Fig. 3). A small incision is made in the pericardium just posterior to the phrenic nerve and parallel to it, after novocainization of the heart has been carried out by topical application in the pericardial sac for ten minutes. Immediately upon opening the pericardium the distended auricular appendage protrudes (Fig. 4). After topical application at the base of the appendage of 1% novocain a purse-string suture of heavy braided cotton is placed above the base of the appendage but not drawn taut. A non-crushing clamp is applied to the appendage distal to the purse-string and the portion protruding above the clamp is amputated (Fig. 5). The special knife is then fitted on to the right index finger, being applied to the palmar surface and held in place by a rubber sheath with its tip amputated to allow protrusion of the blade (Fig. 6). Bailey has suggested using a second glove fenestrated to allow protrusion of both the blade and handle. However, in our hands, we have found that his technique does not allow easy manipulation of the knife and occasionally has caused tears in the second glove. For these reasons, we prefer the rubber finger cot and have found it most satisfactory.

Upon releasing the clamp slowly the finger armed with the special knife is inserted into the left auricle as the purse-string is temporarily tightened to prevent blood loss. The average blood loss during insertion of the finger is approximately 75 to 100 c.c. A leisurely digital examination of the auricle can then be carried out and the mitral valve opening explored. It is surprising to note on electrocardiographic tracings that the heart tolerates the finger in the auricle without any sign of change in rhythm or rate. On every occasion the index finger remained in the auricle during the procedure for an average of 20 minutes and no electrocardiographic changes were recorded.

Once the condition and location of the valve has been recognized the direction of the commissure is located by the palpating finger and the knife blade is slipped into the opening, applied to the antero-lateral commissure and the incision is made out to the flexible normal area. The knife is then withdrawn under the finger cot and the valve explored again. If there is still marked rigidity of the valve and insufficient opening the blade is reinserted and a second cut is made in the antero-lateral commissure, making sure that one reaches the flexible normal tissue. Should the valve still not open satisfactorily the finger and hand are pronated and a similar incision is made along the medial commissure. Great care must be taken to direct the knife blade well posteriorly on the medial side, even cutting at the expense of the posterior valve cusp, as a section in the anterior or aortic cusp is liable to result in fatal regurgitation as did occur in one or two cases done by Bailey[12] and in one of ours.

After these procedures the valve is once more explored by the finger and if the opening is adequate the finger and knife are withdrawn as the purse-string is tightly closed and ligated. It is noteworthy that upon withdrawal of the finger, there is no blood loss. This purse-string suture is then reinforced by oversewing the cut edges of the auricular appendage with a continuous heavy cotton suture. The incision in the pericardium is left open to drain into the pleural space to prevent possible tamponade. The pleural space is drained in the usual fashion and the wound is closed.

During the intra-cardiac manipulations the only changes noted were reported by the anæsthetist. This is readily understood, as when the pulp of the index finger occludes temporarily the mitral opening, the blood pressure as recorded by the anæsthetist drops to zero. For this reason, it is advisable not to occlude the mitral opening for more than three or four beats. The heart however does not change in rhythm as previously mentioned, and several explorations of the opening can be carried out in this fashion until one is satisfied of the exact location of the commissures to be sectioned.

We have to date performed this operation on three patients, the first case dating back to February, 1950. The follow-up period is much too short to determine the long term value of such a procedure. But to date, the two first patients operated upon have shown excellent recovery and very marked clinical improvement. These two first patients were young men aged 17 and 22 respectively who were totally incapacitated by a very rigid mitral stenosis. The second patient showed calcification of his mitral opening and on three separate occasions

had required hospital care over the past year for very severe hæmorrhages. Since their operations these two patients have improved to the point where their exercise tolerance is now at least double that of their preoperative tolerance and one of them has resumed normal activity and work. The other patient is now able to walk long distances without shortness of breath and can even run, which he had not been able to do for years previous to his operation.

The third patient operated upon unfortunately died 48 hours after operation in complete arrhythmia. Autopsy showed that the incision on the medial side had been placed 1/8 of an inch anterior to the commissure and had therefore incised the anterior or aortic cusp. This patient was 34 years old and had suffered from a right hemiplegia three years preoperatively and for one year previous to operation had had auricular fibrillation. We recognized that he was a very poor surgical risk but in view of the fact that he was totally incapacitated, we undertook to perform a commissurotomy upon him. It is evident now that because of the aortic regurgitation caused by the section anterior to the medial commissure, this man's cardiac state could not stand such sudden reversal of his long established stenosis. This would appear to be the cause of death in this case. In future it is hoped to control the complete arrhythmia postoperatively in such bad risks by the administration of digitalis and quinidine.

CONCLUSION

It is still too early to judge of the final functional results in patients submitted to this operative procedure. Nevertheless, we feel that surgical treatment of mitral stenosis is feasible and a relatively safe procedure. We realize that this operation is not as yet ideal in that it is still a relatively blind approach, but pending application of extra-corporeal circulation by machines which are still in the experimental stage, we believe this operation to be of value.

SUMMARY

1. A short review of the different surgical procedures on the mitral valve is presented.

2. Commissurotomy as advocated by Bailey, Glover and O'Neill is discussed in detail.

3. Three cases have been operated upon by this technique with excellent results to date in two patients and one postoperative death.

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RÉSUMÉ

Depuis vingt-cinq ans plusieurs techniques chirurgicales ont été proposées pour le traitement de la sténose mitrale. L'auteur fait une revue de ces différentes techniques et discute celle suggérée par Bailey, Glover et O'Neill de Philadelphie. Cette opération consiste en une commisurotomie faite au moyen d'un couteau adapté à l'index. La commisurotomie permet de faire une inspection digitale de la valvule sténosée; de plus l'expérience du groupe de Philadelphie montre que les incisions dans les commisures n'ont pas tendance à se refermer. L'auteur préfère la voie d'abord antéro-latérale plutot que la sous-mamelonnaire de Bailey. Il croit que dans cette position il n'est pas nécessaire de luxer le cœur pour atteindre l'auricule. L'auricule dans tous les cas de sténose mitrale est de volume considérable. Après novocainisation une suture en bourse est placée autour de l'auricule et sa partie distale est amputée sur une pince non traumatisante. Le couteau est ensuite fixé à l'index par un doigt de gant coupé à son extrémité et le doigt est intrduit dans l'oreillette en passant par l'auricule. Un fois le palpation faite le couteau sectionne d'abord la commisure antéro-latérale et finalement la médiane si l'exploration montre que l'ouverture est insuffisante. La brêche est ensuite refermée. Trois cas ont été opérées selon cette technique avec une mortalité. Les deux vivants sont des jeunes hommes autrefois totalement invalides et qui maintenant font une vie plus ou moins normale. Le troisième mourut d'arythmie 48 heures après l'opération. Il s'agissait d'un homme plus agé ayant déjà présenté des accidents vasculaires. L'auteur croit que cette opération peut donner des resultats excellents et que c'est actuellement l'intervention de choix dans la sténose mitrale.

YVES PRÉVOST

CORTISONE AS AN ADJUNCT IN THE TREATMENT OF POSTOPERATIVE STIFFNESS OF THE HAND

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THE dramatic effects achieved by Hench and associates,[1] as well as Elkington,[2] Ragen[3] and others, with adrenocorticotropic hormone or cortisone in the treatment of rheumatoid arthritis have spurred investigation into the influence of these hormones on other collagen diseases and mesenchymal tissues. Recent papers by Ragan

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and co-workers[4, 5] indicate that both cortisone and ACTH retard the development of all elements of connective tissue and inhibit the growth of granulation tissue in open wounds. In view of these systemic effects, it was considered of interest to study the influence of parenterally administered cortisone in large doses on a patient three and a half months after operation for Dupuytren's contracture, where excessive scar tissue had formed postoperatively. Since we[6] have observed that healing is delayed in some cases in which the wound coexisted with the systemic administration of cortisone or ACTH, we considered the possibility that beneficial effects might result from administration of these hormones even after complete maturation of scar tissue. The following case serves to illustrate this supposition.

Fig. 1

Fig. 2

Fig. 3

Fig. 1.—Maximum amount of extension of fingers which was possible when the patient was admitted to hospital 3½ months after operation. Photograph was taken one day prior to commencement of cortisone therapy. **Fig. 2.**—The marked improvement in range of extension of the middle, ring and little fingers as seen following two weeks of cortisone therapy. **Fig. 3.**—Cast of hand taken with fingers extended as fully as possible one month after cessation of hormone treatment. The improvement obtained during the two weeks of cortisone therapy was not only maintained but also further continued.

R.A., aged 45 years. The patient's past history was non-contributory. However, the family history revealed a strong hereditary predisposition to Dupuytren's contracture, since the patient's maternal grandfather, father and two brothers had become affected with the same condition. For approximately six months before admission contracture of the patient's right hand had gradually developed. The right ring finger exhibited the greatest degree of contracture and lacked complete extension by about 1 centimetre. There was no involvement of the left hand.

A complete fasciectomy was performed by one of us (V.M.) through the usual Bunnell incision on January 29, 1950. Following operation there was some slight delay in healing of the skin incision, with development of excess scar tissue in the palm and subsequent limitation of extension of the little, ring and middle fingers. Seven weeks postoperatively, intermittent elastic traction splinting of the hand was carried out for three weeks. Upon discontinuing the use of this splint the fingers contracted markedly. Nine weeks postoperatively 400 mgm. of vitamin E was given daily for one month, and since no improvement occurred as a result of this therapy 15 mgm. of desoxycorticosterone acetate and 300 mgm. of vitamin C were given daily for one week, without benefit.

Three and a half months after operation the patient was admitted to the Royal Victoria Hospital. The maximum amount of extension which could be obtained is shown in Fig. 1. There was dense scarring in the region of the incision on the hypothenar eminence and along the distal flexion crease of the midpalm. Beginning on May 11, cortisone acetate was administered intramuscularly in doses of 100 mgm. daily for one week. The dose was then increased to 200 mgm. daily for another week because the eosinophil count had not shown an adequate drop. Physiotherapy, consisting of whirlpool baths and massage, was started on May 15, and five days later an elastic extension splint was applied. During the two-week period of cortisone therapy there was marked improvement in the degree of extension of the little, ring and middle fingers (Fig. 2). The systemic manifestations were as follows: the eosinophils decreased to 10 at the conclusion of treatment, there was an increase in body weight of 5 pounds and the blood pressure showed no significant change.

During the two-month period prior to cortisone therapy, elastic extension splinting had been used for several weeks without visible improvement. Therefore it was considered most probable that the addition of cortisone therapy to physiotherapy and active splinting largely contributed to the rapid improvement which took place during the two-week period of parenteral cortisone ther-

apy. One month after cessation of hormone treatment the degree of extension of the fingers had improved still further (Fig. 3), and one month later the patient reported a further improvement. The clinical data and timing of the various types of treatment are summarized in Fig. 4.

SUMMARY

Considerable evidence has accumulated which shows the inhibitory action of cortisone on the development of fibroblasts and granulating tissue. The clinical evidence of relief of pain, free movement of affected joints and decrease in the size of joints in rheumatoid arthritis following therapy with ACTH or cortisone suggests the use of this therapy in patients with limitation of movement of joints from other causes.

Bunnell[7] has emphasized that many patients with Dupuytren's contracture are particularly prone to suffer from stiffness of the joints of

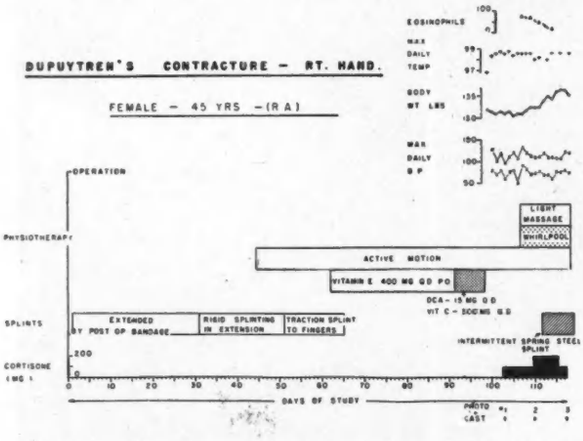

Fig. 4.—Graphic illustration of the complete range of therapeutic measures employed, in order of sequence.

the hand following operation, which in some cases may persist for a year before the full range of functional movement is obtained. Excessive scar tissue developed in this patient's hand following operation although no gross infection had occurred, and she did not obtain benefit from active elastic splinting, physiotherapy, vitamin E, or desoxycorticosterone acetate and vitamin C therapy. However, there was marked improvement when cortisone was employed as an adjunct to active splinting and physiotherapy. Despite discontinuance of the hormone treatment for over two months there has been further gradual improvement, which has augmented the rapid increase in the degree of extension which was obtained during the two-week period of therapy with cortisone.

While it is hazardous to attempt an evaluation of the efficacy of this hormone on the basis of its trial in one patient, we are presenting this case in the hope that others may extend the scope of this investigation.

The authors wish to thank Dr. William Douglas for compiling detailed records of this patient's clinical course.

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LA CORTISONE COMME ADJOINT DANS LE TRAITEMENT DE LA RAIDEUR POSTOPERATOIRE DE LA MAIN*

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LES résultats dramatiques obtenus par Hench et ses associés,[1] Elkington,[2] Ragen[3] et d'autres, avec l'hormone adrénocorticotropique ou cortisone dans le traitement de l'arthrite rhumatoïde ont stimulé les recherches visant l'effet de cette hormone sur les autres maladies des tissus collagènes ainsi que sur les tissus mésenchymateux. Dans de récents rapports Ragan et ses collaborateurs[4, 5] démontrent que la cortisone et l'ACTH retardent toutes deux le développement de tous les éléments du tissu conjonctif et inhibent la croissance du tissu de granulation dans les plaies ouvertes. C'est pourquoi on a cru intéressant d'étudier les effets de l'injection de cortisone à hautes doses chez une malade trois mois et demi après qu'elle fut opérée pour maladie de Dupuytren, avec formation postopératoire de tissu cicatriciel surabondant. Ayant noté un retard de la guérison dans certains cas où des injections de cortisone ou d'ACTH avaient été pratiquées chez la blessée, nous[6] crûmes pouvoir obtenir de bons résultats en nous servant de ces hormones même après que le tissu cicatriciel fut complètement formé. A l'appui de cette théorie nous croyons devoir relater le cas suivant.

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R.A. âgé de 45 ans. L'histoire de la malade était négative. Dans ses antécédents familiaux cependant on relève une forte prédisposition héréditaire à la maladie de Dupuytren, dont avaient déjà souffert son grand-père maternel, son père et deux de ses frères. La contracture de la main droite de la malade s'était peu à peu développée environ six mois avant son admission, atteignant son plus haut degré à l'annulaire dont l'extension complète manquait par à peu près un centimètre. Il n'y avait pas d'atteinte de la main gauche.

Le 29 janvier 1950, l'une de nous (V.M.) pratiqua une aponévrectomie complète au moyen de l'incision Bunnell ordinaire. L'incision de la peau tarda quelque peu à guérir après l'opération, avec formation de tissu cicatriciel surabondant dans la paume puis limitation de l'extension du majeur, de l'annulaire et du petit doigt. Sept semaines après l'opération, on pratiqua au moyen d'une attelle la traction élastique intermittente de la main pendant trois semaines. L'appareil sitôt enlevé, les doigts se contractèrent de façon marquée. Neuf semaines après l'intervention on donna 400 mgm de vitamine E tous les jours pendant un mois, puis ce traitement s'avérant inefficace la malade reçut 15 mgm d'acétate de désoxycorticosterone et 300 mgm de vitamine C tous les jours pendant une semaine, mais sans résultat.

Trois mois et demi après l'opération la malade fut admise à l'Hôpital Royal Victoria. La Fig. 1 montre le degré maximum d'extension que l'on pouvait obtenir. Une cicatrice épaisse était visible sur le trajet de l'incision à l'éminence hypothénar ainsi que le long du pli de flexion externe de la paume. On commença le 11 mai à pratiquer des injections intramusculaires d'acétate de cortisone à la dose quotidienne de 100 mgm pendant une semaine, puis à celle de 200 mgm pour une autre semaine parce que la numération des éosinophiles ne montrait pas qu'ils avaient baissé de façon appréciable. La physiothérapie, consistant en massage et bains à eau tourbillonnante, fut entreprise le 15 mai, puis une attelle à tension élastique posée cinq jours plus tard. Au cours du traitement de deux semaine à la cortisone l'extension du majeur, de l'annulaire et du petit doigt s'améliora de façon remarquable (Fig. 2). On nota les manifestations générales suivantes: les éosiniphiles tombèrent à 10 à la fin du traitement, le poids de la malade s'éleva de 5 livres et sa tension artérielle ne montra aucun changement appréciable.

Durant les deux mois qui précédèrent le traitement à la cortisone, l'attelle à extension élastique fut appliquée pendant plusieurs semaines sans aucune amélioration notable. C'est pourquoi nous crûmes qu'en toute probabilité le fait d'avoir ajouté le traitement à la cortisone à la physiothérapie et à l'extension active s'était avéré un facteur puissant dans l'amélioration rapide observée au cours des deux semaines d'injections intramusculaires de cortisone. Un mois après qu'on eut cessé ce traitement l'extension des doigts se faisait encore beaucoup plus facilement (Fig. 3), une amélioration que la malade disait davantage marquée un mois plus tard. Les données cliniques et le temps donné aux différents modes de traitement sont résumés dans la Fig. 4.

RÉSUMÉ

L'action inhibitive de la cortisone sur le développement des fibroblastes et du tissu de granulation reçoit sans cesse d'éclatantes confirmations. Si l'on en juge par les résultats cliniques obtenus dans le soulagement de la douleur, la mobilisation d'articulations atteintes et leur diminution de volume dans l'arthrite rhumatoïde à la suite de traitement à la cortisone ou à l'ACTH, il est permis de songer à cette thérapie chez des malades qui ont une limitation de leurs mouvements articulaires provenant d'autres causes.

Bunnell[7] a souligné que nombre de sujets atteints de la maladie de Dupuytren sont particulièrement enclins à présenter une raideur post-opératoire des articulations de la main, raideur pouvant parfois persister un an avant que les mouvements reprennent leur pleine étendue. Bien qu'aucune infection ne vint compliquer l'intervention il se forma un excès de tissu cicatriciel dans la main de notre malade, et elle ne tira aucun profit de l'attelle élastique à mobilisation active, de la physiothérapie, de la vitamine E, ni du traitement à l'acétate de désoxycorticostérone et à la vitamine C. Une amélioration notable se manifesta cependant lorsque la cortisone fut administrée conjointement avec la mobilisation active et la physiothérapie. Faisant suite aux rapides progrès de l'extension obtenus durant les deux semaines de traitement à la cortisone, on continue de noter une amélioration progressive bien que la thérapie hormonale ait cessé depuis déjà plus de deux mois.

Bien qu'il soit risqué de tenter d'évaluer l'efficacité de la cortisone sur la foi d'un seul essai, nous croyons devoir rapporter ce cas dans l'espoir d'engager plus à fond les recherches dans cette direction.

UNDECYLENIC ACID ADMINISTERED ORALLY IN THE TREATMENT OF PSORIASIS*

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IN February, 1949, Perlman[1] published a preliminary report on the effects of undecylenic acid by mouth in the treatment of psoriasis and neurodermatitis. Although he stressed the fact that this was a preliminary report and that nothing definite was claimed, the reports unfortunately found their way into the daily press and into the "digest" magazines. Immediately the public was seized with a desire to try this new "cure" of psoriasis and so without any corroboration of the work by other investigators, the drug was administered to

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psoriatic patients throughout the length and breadth of North America.

In July, 1949, a second report by Perlman and Milberg[2] appeared, also optimistic in tone, but warning that this drug was still in the experimental stage. In October, Warshaw[3] reported a series of 30 cases of psoriasis with some improvement in only 50% of them. In the same month, Ereaux and Craig[4] reported a series of 17 cases of psoriasis treated by this method. Their results were encouraging in some respects and discouraging in others. The results of these four groups of investigators will be charted together with the results of the present series of cases being reported.

In June, 1949, Dr. J. H. Wallace, Jr. of the Decyl Pharmacal, Princetown, N.J., kindly provided through his Canadian distributors, the Laurentian Agencies Ltd., a supply of undecylenic acid perles for clinical trial at Sunnybrook Hospital, and the Toronto General Hospital. These perles contained 0.44 gm. of the drug and were marketed as Declid capsules.

A group of psoriatic cases who presented themselves at these two hospitals for the next four months, were treated with this drug. It was our endeavour to obtain patients who would promise to give the drug a fair trial for a period of at least four months, and who would report for observation afterwards. We also tried to obtain patients whose disease was in a stationary state or was progressing.

REACTIONS TO TREATMENT

The dosage schedule was low compared to some reported, namely, two capsules three times daily, increasing in a week to a maximum of five capsules three times daily and maintained at that level. Notwithstanding this dosage, nearly every patient complained of nausea, belching of gas, abdominal discomfort and a few of diarrhœa. In several cases, it was with difficulty that the patients were persuaded to continue the drug.

At Sunnybrook Hospital, we followed carefully the leucocyte and differential blood counts, the hæmoglobin and urinalysis. Nothing abnormal was discovered in any of these so that this laboratory investigation was discontinued. None of the patients experienced any gastric or intestinal hæmorrhage, nor was there any serious aggravation of their disease.

The following is a brief summary of the results of the four series of cases reported in 1949, and a summary of results of the present series.

TABLE I.
RESULTS

	Patients
H. H. Perlman—18 patients	
Completely clear of disease	3
75% improved	6
50% improved	9
H. H. Perlman and I. H. Milberg—40 patients	
Much improved	12
Somewhat improved	15
No change	10
Worse	3
T. G. Warshaw—30 patients	
Improved greatly	5
Moderately improved	9
Worse	4
Unchanged	8
Effect not determined	4
L. P. Ereaux and G. Craig—17 patients	
Greatly improved	3
Slightly improved	9
Unimproved	5
Present series—19 patients	
Slightly improved	4
Unchanged	10
Worse	5

DISCUSSION

The present series reported included ten males and nine females. The duration of their psoriasis varied from six months to twenty-five years with the average being thirteen years. The age of the patients varied from 21 to 66 years. Most of them were moderately severe cases who had tried many treatments with varying success. Of the service veterans who were treated in Sunnybrook Hospital, all but one had previously been treated as in-patients by the Goeckerman[5] routine of therapy with pronounced but temporary improvement. However, they were as anxious to try this new type of therapy as the civilian group.

Duration of treatment varied from one to six months with an average of three months. Dosage recommended was fifteen perles daily, 0.44 gm. each, and this dosage was usually maintained for the duration of treatment. Thus, on the average, each patient took 90 days' treatment of 6.6 gm. of the drug daily or 594 gm. of undecylenic acid.

All four patients who showed improvement had intertriginous psoriatic lesions in the crural, inguinal or intergluteal regions. Each of the four patients noted a quick diminution in the annoying itching and less redness and scaling. One patient who showed this improvement in the crural region experienced an exacerbation of the psoriasis in the extensor sites. One patient who had severe psoriasis of the intergluteal and extensor sites, had no benefit from three months' treatment.

One patient with very severe rheumatoid arthritis and intertriginous psoriasis was treated. Within a month she had considerably less pain in her joints and less itching in the vulvar, perineal and intergluteal areas. This improvement continued for three months.

The other fifteen patients showed no improvement in therapy and must be considered as failures.

In considering the results of these four groups of patients, there is considerably less optimism and encouragement in those reported by Warshaw, Ereaux and Craig, and the present series, than in those reported by Perlman and Milberg.

One must not lose sight of the fact that large doses of undecylenic acid by mouth influence some cases of psoriasis, even though slightly. In the present series, this effect was chiefly in the intertriginous group. It is possible that this therapy might point the way to some similar but more effective one in the future.

SUMMARY

Undecylenic acid by mouth has been used in large doses in the treatment of psoriasis in many different centres for more than a year.

It affects some cases of psoriasis favorably but the improvement is not usually maintained even though the drug is continued.

In the present series, four patients with psoriasis in the intergluteal, perineal and crural areas were benefited as far as diminution of itching, redness and scaling were concerned.

Fifteen other patients who were treated showed no improvement or became worse during the treatment.

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CHOICE OF PATIENTS FOR SYMPATHECTOMY IN THE FIELD OF PERIPHERAL VASCULAR DISEASE*

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THE internist and the general practitioner must often decide whether patients with peripheral vascular disease would benefit by sympathectomy. They are often called upon to make a decision whether such a patient should go to the expense of being investigated further in an institution prepared to carry out such surgery. Almost daily I see patients who should not have been put to such expense and, on the other hand, patients who long before should have been submitted to sympathectomy.

Nature has placed a thermostatic arrangement in our limbs under the control of the sympathetic nervous system, making possible the regulation of the flow of blood through our peripheral vessels in the same manner as the flow of hot water is controlled through a radiator. The sympathetics control the tonus of smooth muscle in the walls of blood vessels, mainly in the skin as far as somatic distribution is concerned, turning on and off heat distribution from the body and thus enabling man to live in his environment, maintaining his proper temperature, unlike the cold-blooded fish who adopts the same temperature as the surrounding water. One must also realize that sympathectomy does not remove disease, but merely changes the hydrodynamics of the circulation and to a certain extent the production of vascular type of pain. What then can we expect of sympathectomy and what are its limitations?

I shall mention in passing that recently stellate ganglionectomy has been tried as a means of relaxing the cerebral vascular bed after cerebral hæmorrhage or thrombosis. It is a little early to evaluate its results in that field. Our results of extensive sympathectomy on visceral and peripheral scleroderma, on the whole, have been disappointing. The future treatment of this disease will probably be by corticosteroids.

Table I shows peripheral vascular diseases arranged as to scale of spasticity. Table II lists the pathologic conditions and suggests reasons why the results of sympathectomy vary according to the pathologic condition.

* Read at General Session of the 81st Annual Meeting, Halifax, June 23, 1950.

TABLE I.

SCALE OF SPASTICITY

0 <——— Spasm ———> ++		
	+	
Arteriosclerotic endarteritis obliterans	1. Arteriosclerotic +spasm	1. Raynaud's disease
	2. Thromboangiitis obliterans (Buerger's disease)	2. Hyperhidrosis
		3. Reflex sympathetic dystrophy (causalgia)
		4. Scalenus syndrome
		5. Cervical rib
		6. Cord tumour
		7. Dyscogenetic disease

TABLE II.

PATHOLOGIC CONDITIONS

Arteriosclerosis	*Buerger's disease*	*Raynaud's disease*
Large arteries	Middle-sized arteries	End arteries
Intimal degeneration	Inflammatory—all coats	Hypertrophy of smooth muscle
Calcification	Sporadically progressive	Reversible early
Irreversible		

On the whole, the preganglionic resection of the third and fourth thoracic segments as ordinarily done for Raynaud's disease has been disappointing in our hands. Within a year most of our patients again complain of blanching with cold followed by blueness and pain with erythema as the hands again warm up. However, trophic lesions usually stay healed unless scleroderma secondary to Raynaud's disease has been far advanced. We suspect the reason for the poor results in the upper limb is the presence of microscopic ganglionic cells in the neural foramina which soon regrow new sympathetic fibres to the hands. Thus, it is probably impossible thoroughly to desympathectomize the fingers. Regrowth of the sympathetics as proved by sweat tests may be very rapid in some people, and such regrowth seems to be faster in the cephalad portions of the body than in the lumbar area. To obtain better results we are now resecting the first to the sixth thoracic segments in an attempt to get more connections and to include the nerve of Kuntz which may come from the third or fourth thoracic ganglion and go directly to the brachial plexus, side-tracking the rami. We do not consider the consequent Horner's syndrome of great significance to the patient. The resultant ptosis is not very noticeable after bilateral resection of the stellate ganglion or first thoracic. Often fusion of the first thoracic with the stellate is so incomplete that separation is possible and no ptosis is obtained. It is too soon to know whether results are superior, but we have one patient who has proved her ability to regenerate fibres into the hands and has had a return of the Raynaud's phenomenon within six months. However, when Raynaud's disease has progressed to the point where there are trophic changes in the fingers, we urge removal of the first to the sixth thoracic segments and feel it is worth while in healing trophic ulcers, preventing gangrene of the finger tips and slowing up the progress of scleroderma. The patient is warned that improvement in the fingers may be only 50 to 85%. If there is involvement of the feet and a lumbar sympathectomy is to be done, we promise 90 to 100% improvement. Other aids such as nitroglycerin ointment locally and antihistaminic drugs to combat a possible physical allergy element in this disease are of value. Priscol and adrenolytic and sympatholytic agents often help. Change of climate may be more practical than sympathectomy.

If Raynaud's disease has been accompanied by scleroderma of the hands we always advise resection of the sympathetic chain from the first to the fifth thoracic segment. Results are better in most cases in which the Raynaud's phenomenon has preceded the development of scleroderma by several years. If the scleroderma is primary or has developed at the same time as the Raynaud changes, our results have been disappoint-

ing. In other words, primary advanced scleroderma of the hands has not responded well to sympathectomy. However, the scleroderma of the yoke, neck, jaws, mouth and cheeks has often responded favourably after removal of the upper thoracic sympathetic ganglions, but such resection must include the first thoracic. One such patient who had difficulty getting dentures in and out of the mouth was able to open her mouth much wider after the sympathectomy. The dentist often notices greater ease in operating on the teeth after sympathectomy in such cases. In 5 patients who had associated œsophageal scleroderma with dysphagia we carried out a complete or almost complete thoracic sympathectomy, with relief of dysphagia in 3. Such complete thoracic sympathectomy implies disconnecting the lesser and greater splanchnic nerves, and since 2 of such patients had such profound postural hypotension after this measure, we now leave the splanchnic connections on one side. Since the splanchnics usually come off the seventh, eighth and ninth thoracic segments, we do resect the tenth, eleventh and twelfth thoracic ganglions on both sides, and thus desympathectomize the lower portion of the œsophagus where the scleroderma and stricture are most marked. Leaving the splanchnic connections on one side prevents profound postural hypotension. We know from our experience doing splanchnicectomies for hypertension that the most profound postural orthostatic hypotensive effect is obtained by splanchnic denervation as compared with the somatic sympathetic denervation. The effect of thoracic sympathectomy on pulmonary scleroderma has been nil as regards cough, improvement of vital capacity or resolution of fibrosis as judged by a roentgenogram of the lungs.

We must not forget the profound rôle the emotions play as an etiologic factor in Raynaud's disease. Sometimes the adjustment of adverse marital factors or the improvement of anxiety wrought by a financial situation may in itself cure a patient with Raynaud's disease.

In the field of Buerger's disease and arteriosclerotic peripheral vascular disease it is necessary to assay the state of the collateral circulation because our main accomplishment is to widen the calibre of these detours. One cannot hope for sympathectomy to alter an occluded large vessel. In general, the slower the development of peripheral vascular disease and the higher the occlusion of the large vessel, accompanied by a fairly healthy appearance of the foot despite such high occlusion, the better is the state of the collateral circulation. In other words, a good collateral circulation has had time to develop and the proof of its development is a fairly viable foot in spite of a high occlusion. This means there is still a good collateral bed to be dilated by sympathectomy. Signs of such a healthy foot are the absence of marked rubor in dependency and the absence of very fast blanching on elevation. Filling of the veins on the dorsum of the foot within ten seconds in the dependent position after elevation denotes good collateral circulation. The presence of abnormal sweating denotes hypertonus of the sympathetic system and the likelihood of a good degree of consequent spasm of the vessels. Such spasm will be released by sympathectomy. It is to be noted that the absence of the pulses then need not discourage us in advising sympathectomy. The criteria rest upon the indications already cited.

There are times, however, when sympathectomy seems only to hasten the onset of gangrene. What are the warning signs that such might be the case? We have attached special importance to a mummified appearance of the foot with longitudinal shrinkage of the skin over the toes and sometimes the dorsum of the foot, very marked rubor in dependency and very rapid blanching on elevation of the foot.

A new test as developed by the Duke University[2] group to determine whether sympathectomy might only hasten gangrene is to ascertain whether 50 mgm. of priscol prolongs venous filling time instead of shortening it. One hour after 50 mgm. of priscol is given we hope to obtain a sympathetic paralysis produced by the drug. If venous filling has been prolonged over what it was before priscol was given, then it is obvious less arterial blood is entering the foot than before and is probably being shunted across the leg above the foot through dilated arteriovenous channels. If the results of the priscol test are equivocal, venous filling time and temperature differences are determined after sympathetic procaine block.

When gangrene has already set in and pain is a prominent feature, however, we always sympathectomize such a limb regardless of these warning signs, if it appears that amputation is inevitable. A preliminary paralumbar sympa-

thetic procaine block is done to ascertain pain relief. If pain is relieved, a sympathectomy is done in the hope that amputation may be averted and if not, we prefer a sympathectomized stump for the sake of better healing and in the hope that it may prevent a phantom limb syndrome.

We offer sympathectomy to all patients under the age of 55 who have Buerger's disease or arteriosclerotic peripheral vascular disease in whom the diagnosis is certain and when gangrene will not be hastened, as cited above. This is done because we believe sympathectomy offers the best life insurance to such a limb. At the same time we do not guarantee relief of intermittent claudication because nature has placed her thermostat near the surface and the "thermostat wires" that are cut control predominantly the calibre of the blood vessels to the skin. We often have a pleasant surprise, however, for it has been proved that there is sympathetic control of the calibre of the blood vessels to the muscles in the legs to some extent. Also, it is sometimes necessary to wait two to three years after sympathectomy for improvement of exercise tolerance.

In dealing with Buerger's disease and arteriosclerotic peripheral vascular disease we have abandoned preoperative temperature studies and now rely solely on clinical criteria. It has been our experience that so many patients have benefited from sympathectomy when temperature studies promised a poor result that we no longer rely upon them. By temperature studies I mean ascertaining the rise of temperature of the affected limb after spinal anæsthesia, paravertebral block or caudal anæsthesia.

Patients who present themselves for an inevitable amputation first have a disarticulation at the nearest point above the area of gangrene, then sympathectomy is performed when systemic toxæmia has subsided, and a few days later they undergo amputation with construction of a proper stump.

Causalgia or reflex sympathetic dystrophy offers a promising field for sympathectomy. This is best illustrated by the following case history.

The patient had sustained a fracture of the second metatarsal followed by persistent causalgia for six months. An exostosis had been removed without relief of pain. Swelling, rubor, trigger points of pain and mottled decalcification of the bones of the foot were present. Sympathetic block relieved his pain and the trigger points disappeared. Sympathectomy was considered necessary before a residual osteomyelitis in the second metatarsal could be attacked surgically.

Table III shows the results of sympathectomy on reflex sympathetic dystrophy.[1]

TABLE III.

RESULTS OF SYMPATHECTOMY ON REFLEX SYMPATHETIC DYSTROPHY

(29 patients)	
100% relief 1 month to 2 years	10
100% relief, follow-up less than 1 month	1
50– 90% relief 1 month to 2¼ years	11
0– 25% relief more than 1 month	7

In the field of reflex sympathetic dystrophy a test block to prove the diagnosis is all important. We have failed to help 2 patients with this syndrome who did not obtain the necessary dramatic though temporary relief following sympathetic block. Such failure really points to a mistaken diagnosis. Failure to cure such patients by sympathectomy also occurs when there is a paucity of the signs of sympathetic dystrophy, namely, sweating, rubor or pallor, atrophy and decalcification of bone. Another pitfall is the fact that reflex sympathetic dystrophy always occurs with a background of high emotional instability and fake blocks are sometimes necessary to rule out the psychic element.

Every fair sized hospital should have one member of its staff trained in the technique of sympathetic block. This is because it is of inestimable value in controlling the pain of peripheral vascular disease and helping to establish the diagnosis.

SUMMARY

We have endeavoured to point out simple clinical methods applicable for the most part in a doctor's office, enabling him to judge whether a patient with peripheral vascular disease might benefit from sympathectomizing the limbs involved.

In Raynaud's disease of the upper extremities the operation is a palliative one only and should be done only if trophic changes have occurred. These include tiny pitting and atrophy of the finger pads, deformity of the nails, absorption of the bone in the distal phalanges and actual ulceration or gangrene. For the milder cases medical means often suffice to make the patient more comfortable. Change of climate in the

winter time may be necessary. If scleroderma is present and Raynaud's disease has anteceded the scleroderma, sympathectomy should be performed.

Sympathectomy, including the first to the fifth thoracic segments, benefits scleroderma of the yoke, face and mouth.

If scleroderma of the œsophagus is present, causing dysphagia and proved by barium swallow, complete bilateral thoracic sympathectomy, preserving the splanchnic connections on one side to avoid postural hypotension, is sometimes beneficial.

We submit most of our patients with Buerger's disease and arteriosclerosis of the lower extremities to sympathectomy, believing it to be the most efficacious palliative measure at our disposal. However, in the older age group with arteriosclerotic endarteritis obliterans who still have good collateral circulation and whose limbs we judge will stay viable for their life expectancy, we do not advocate sympathectomy. The operation should be sold on the basis of life insurance for the limb and without promising to relieve entirely the intermittent claudication. This limitation is often a disappointment to the patient who comes to us for relief of his inability to walk far, but the operation usually triples or quadruples his exercise tolerance. In a patient with Buerger's disease we must also guard ourselves in not promising relief from recurrent superficial phlebitis migrans. These attacks we now treat by ambulatory anticoagulation therapy.

Sympathectomy has been effective in relieving 76% of 29 patients with reflex sympathetic dystrophy.

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THE EARLY DIAGNOSIS OF BRONCHOGENIC CARCINOMA.—Reliable evidence indicates that bronchogenic carcinoma is increasing in incidence; in males it is exceeded in frequency only by cancer of the stomach. Since a clear-cut symptom complex is rarely present, one must constantly suspect carcinoma in the presence of any pulmonary symptoms or signs of doubtful etiology. Once a reasonable suspicion of lung carcinoma exists, the investigator should pursue a vigorous investigative course, using all available facilities necessary to establish a conclusive diagnosis.—Reitz, H. E., *U.S. Nav. M. Bull.*, **48**: 198, 1948.

SCURVY—RECENT EXPERIENCES*

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THE subject of this paper may cause some bewilderment because scurvy has for a long time been considered an extinct disease, and also because of a veiled suggestion that there may be some new line of therapy. The reason, however, for presenting this subject is the relatively large number of cases of scurvy which we have seen at the Children's Hospital, Halifax, in recent years, and particularly during the past twelve months. There is no new form of therapy in the treatment of scurvy, and indeed none is needed. The disquieting fact is that the disease should be prevalent at all, when it is one which can be so easily prevented.

A review of our cases of advanced clinical scurvy since June 1, 1945, shows:

TABLE I.

Year	*Cases*
1945	3
1946	2
1947	11
1948	2
1949	14
1950 (To May 31)	5

No accountable reason has been found for the relatively large number of cases in 1947 and 1949.

There is no specific seasonal arrangement generally given for scurvy, and in our cases they were scattered over the year with the greater number occurring between the months of June and December.

TABLE II.

	1945	*1946*	*1947*	*1948*	*1949*	*1950*
January			1			
February			1			2
March			1			2
April			1			
May			1		1	1
June				1	5	
July					2	
August	1		1	1	2	
September			3		2	
October	1	2			2	
November	1					
December			2			

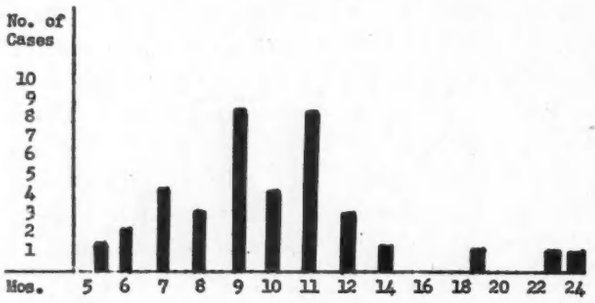
The average length of time for scurvy to develop following cessation of vitamin C is 6 to 10 months. A review of the age group shows

* Presented at the 81st Annual Meeting of the Canadian Medical Association, sub-section of Pædiatrics.

89% of the cases occurring within the latter half of the first year of life.

There is good evidence that moderate deficiencies of vitamin C impair health without giving rise to the classical signs which result in a diagnosis of scurvy.

TABLE III.



The fully developed picture of scurvy is generally readily and easily recognized. The early symptoms, however, do vary considerably. This, together with the fact that the weight of a scorbutic infant is often high, due to the presence of œdema, may lead one to a false appreciation of the nutritional and physical state, and so delay diagnosis in the earlier stages.

The symptoms first noted by the parent and those observed prior to admission to hospital are divided as follows:

TABLE IV.

	First symptom	*Later symptoms*
Pain, lower limbs only	18	10
upper limbs only	1	1
body as a whole	6	1
Irritability	17	3
Anorexia	6	4
Swelling of extremities noted	2	3
Swelling elsewhere noted	3	2
Bleeding gums	1	6
Vomiting	3	4
Increased perspiration	2	1
Rash on skin	1	0
Loss of weight	1	0
Sleeplessness	0	2
Diarrhœa	0	2
Fever	0	1
Hæmaturia	0	1
Earache	0	1

Whereas these may be the more common symptoms observed by parents, there are other signs of impairment to health which are present at the same time, such as decreased capacity to form and maintain a normal collagen level, slow healing of wounds, decreased capillary strength, decreased capacity to combat infections and a decreased capacity to metabolize the amino acids, tyrosine and phenylalanine.

The complaint of earache is not one often associated with scurvy except as part of a co-existing upper respiratory infection. One writer has drawn attention, however, to the relationship of scurvy to grippe or influenzal otitis and myringitis bullosa hæmorrhagica. Although all the reported cases were children and adults, there is no reason to assume that they could not occur in infants.

The diagnosis in each case was made purely on clinical grounds and x-ray. No vitamin C estimations of the blood were done. X-ray evidence was present in the long bones in all cases. These included some or all of the following: cortical atrophy, ground glass atrophy of the ends of the shaft, infractions of the epiphysis, periosteal elevation and the typical white line. Many also showed evidence of swelling of the soft tissues of the lower extremities and, later, evidence of subperiosteal hæmorrhage.

Much has been written on anæmia in scurvy and all our cases showed varying degrees of this condition. The hæmoglobin ranged from 22 to 77% and the red count from 2 to 3.5 million. Except for one case, which was a macrocytic hyperchromic anæmia, all were essentially normocytic normochromic in type. The white count varied between 6,000 and 26,000. This wide range is undoubtedly due to the presence of secondary infection, and 12, or 32.5%, of the cases showed some additional infection of one type or another on admission to hospital.

Administration of vitamin C in the form of orange juice showed:

TABLE V.

A. Orange juice given	
Supposedly satisfactory amounts	9
Insufficient amounts (1 tsp. daily)	2
B. No orange juice given	
Never given	14
Vomited the orange juice	2
Baby did not like orange juice	1
Caused diarrhœa	1
Told not to because of laxative effect	1
Had been getting orange juice but stopped because mother thought not necessary	1
C. Orange juice given on occasion only	1
D. No information	5

The majority of the nine cases who developed scurvy in spite of getting a supposedly sufficient supply of orange juice had been warming or heating the juice before giving it to the baby. This fact is often not brought out except by careful questioning of the family and, there-

fore, may as a result lead to a delay in diagnosis. In this regard there must exist a definite misunderstanding concerning the stability of vitamin C. As is well known, oxidation of vitamin C goes on as soon as an orange is cut but the process is accelerated by heat, light and alkalinity, and, if copper is present, the process goes on still more rapidly.

The group which demands attention is the one where orange juice was either never given or stopped early because of some associated factors such as vomiting, dislike by the baby, and so on. In spite of these occurrences it is difficult to understand why, with all that is written today in the popular journals, such an indifference to the use of vitamin C should still persist. It may be that while most parents are familiar with the idea of giving orange juice, many still do not understand why it is important to do so. In any event, it is more likely to be a lack of appreciation of the need of vitamin C than inaccessibility to the means of prevention.

In many cases it happens that parents are simply told on one occasion to give orange juice to the baby, but because of one or more of the above-mentioned associated factors, it is discontinued. On subsequent visits to the physician there exists the assumption that the infant is getting some form of vitamin C, but no further check is made to ensure that this is the case. This state of affairs may go on for many months, and because there are no abnormal signs or symptoms both parents and physicians are lulled into a false sense of security owing to the long latent period which exists between the beginning of the deficiency in the diet and the onset of symptoms.

With this in mind, and remembering that even moderate deficiencies impair health, the physician should, therefore, as a routine procedure, always question the parent regarding the intake of vitamin C. His instructions in this regard should be implicit, and should stress the reasons for the giving of orange juice.

Because most cases of deficient vitamin intake are found in the poorer economic group, the question of meeting the infants' needs with fresh orange juice becomes a factor. Also, as these cases are found entirely among the artificially fed and essentially in urban areas, being almost unknown in the breast fed and rare in rural districts, if there is any question of the infant not taking or tolerating orange juice, or if there is any doubt about the co-operation of the parent, or if economic reasons are a factor, it would be advisable for the physician to use the easily procurable and well tolerated ascorbic acid tablets.

On the basis of published evidence, the Food and Nutrition Board of the National Research Council (USA) recommends the following intake:

TABLE VI.

Children under 1 year	30	mgm.	per day
" 1 to 3 years	35	"	"
" 4 to 6 "	50	"	"
" 7 to 9 "	60	"	"
" 10 to 12 "	75	"	"

As fresh orange juice contains approximately 0.5 mgm. per c.c., the infant's requirements can only be met by giving at least two ounces of orange juice daily, which may indeed prove a burden to certain economic groups.

Again, one should always bear in mind that if clinical scurvy exists, there are many more cases of latent scurvy which remain unrecognized. Published reports indicate that this applies not only to the infant but to the older age group as well.

One might naturally expect that the older infant and child, with their broader, even though deficient, diets, would be more prone to suffer from latent scurvy with its various ills and substandard nutritional states. There is always the possibility that some of these might go on at any moment to show the picture of classical scurvy if any infection should develop. The probable reason that more of them do not is because the physician's routine instructions to force fruit juices in the presence of an infection prevents the development of manifest scurvy and unwittingly improves the deficiency. A temporary stay in the course of the disease may thus be obtained but unless the physician bears the condition in mind and permanently corrects the deficiency, the impairment to health continues.

Much can be done in this respect by improving the balance of the diet and the use of selected foods even in the poorer economic groups. It is true that fresh cow's milk will normally prevent scurvy and this is one reason why it is seldom found in rural areas. Pasteurization, on the other hand, renders it useless in this respect. However, the use of fresh un-

pasteurized milk as an antiscorbutic food is open to question because of the possibility that such milk may cause other infections.

We may therefore conclude that the maintenance of an adequate vitamin C intake is the responsibility of all those interested in the growth and development of children, and that the question of a reliable intake in all age groups and economic brackets is one of practical concern.

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RÉSUMÉ

L'auteur présente 37 cas de scorbut constatés depuis 1945. Malgré les progrès dans l'alimentation des enfants le scorbut n'est pas encore une maladie entièrement disparue. Tous les cas ont été diagnostiqués cliniquement et radiologiquement, sans dosage de la vitamine C. Les signes les plus fréquents furent, des douleurs dans les jambes, de l'irritabilité et de l'œdème. Très peu souvent on trouva des gencives hémorragipares. L'anémie fut constatée dans la plupart des cas. L'auteur explique ces déficiences en vitamine C par les faits suivants. Ou bien les enfants reçoivent une quantité suffisante de jus d'orange mais ce dernier est chauffé avant l'administration, ou bien il s'agit de négligence de la part du médecin ou des parents. L'auteur suggère qu'un questionnaire de routine soit toujours fait par le médecin traitant pour s'assurer que l'enfant recoit une quantité suffisante de vitamine C synthétique ou sous forme de jus d'orange.

YVES PRÉVOST

CLINICAL USE OF THE OXIMETER*

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THE degree of oxygen saturation of the peripheral arterial blood is a matter of fundamental importance in health and disease. Clinically, the only definite means of determining that there is oxygen unsaturation of the arterial blood has been the sign of cyanosis. This, unfortunately, is a very crude indication of anoxæmia, for it is well established that there must be a considerable degree of unsaturation before the amount of reduced hæmoglobin is sufficient to result in a blue colour.[1, 2] In a subject with a normal hæmoglobin, the oxygen saturation of the arterial blood must be reduced from the average normal of approximately 98% to between 65 and 70%. At this level approximately 10 grams of hæmoglobin in each 100 c.c. of blood will bear oxygen and 5 grams will be reduced hæmoglobin. These calculations serve to indicate the marked reduction in oxygen saturation which must occur before the classical clinical sign of anoxæmia, cyanosis, becomes evident.

The desirability of having a more subtle means of determining the lesser degrees of oxygen unsaturation is apparent. This may be done by arterial puncture with subsequent analysis of the blood by the technique of Van Slyke and Neill.[3] This procedure involves discomfort, it is time-consuming, and it is not applicable to routine clinical practice. The efforts of the past few years in devising a clinically applicable method to determine oxygen saturation have resulted in extensive studies in oximetry, a term which is applied to the study of oxygen saturation of circulating blood by photoelectric techniques.

The manner in which an oximeter is employed is as follows. An earpiece is attached to the pinna of the ear. It has been established that when the ear is flushed with heat, the blood contained within it has an oxygen content practically equivalent to that in the peripheral arteries. On one side of the ear is an electric bulb from which light of known intensity is emitted. The heat of this lamp causes the necessary vasodilatation. This illumination passes through the substance of the pinna to fall upon two filters—an infra-red filter and a red filter. Light which has been transmitted through the ear and through these filters then falls upon two light-sensitive photoelectric selenium cells. The potential developed by these cells is impressed upon a sensitive galvanometer and recorded as a spot of light illuminating a scale, from which calculations may be determined to ascertain the percentage saturation.

It is apparent that the pinna varies in its characteristics from one individual to another. Ears differ as to thickness, pigmentation and concentration of the hæmoglobin contained within their blood vessels. Various means are employed to account for these differences, the necessary deductions being obtained partly from changes in the incident light which has passed through the infra-red filter. Wood[4] employs marked pressure to compress the ear, rendering it bloodless, and taking measure-

* From the Children's Memorial Hospital and the Department of Physiology, McGill University. Aided by a Grant from the National Research Council of Canada. Read before the Canadian Society for the Study of Diseases of Children, Niagara Falls, Ontario, June 3, 1950.

ments in the bloodless state and when it is flushed. With the use of the present instrument[5] it is unnecessary to compress the ear.

The red filter transmits light of wavelengths above about 600 millimicrons. Light rays in the band of about 620 to 680 millimicrons are more freely transmitted by oxygenated hæmoglobin than by reduced hæmoglobin. The transmission of light by hæmoglobin bears a logarithmic relationship to the percentage of its oxygenation. More light in this wavelength is transmitted by oxygenated hæmoglobin and less by reduced hæmoglobin.

A brief résumé of the history of the oximeter will indicate the impetus provided by the war in the practical development of this type of instrument. The German scientists Kramer[6] and Matthes[7] independently in 1934 published methods for the determination of the oxygen saturation of arterial blood by means of photoelectric cells. The greatest advance in bringing about the ready clinical use of this concept was made by Millikan[8] in 1942 when he was faced with the problem of determining oxygen saturation of peripheral arterial blood of U.S. Air Force flyers at various altitudes. After the war, Wood[4] was the first to develop an oximeter for the recording of absolute measurements of the percentage saturation of peripheral arterial blood.

Clinical studies in oximetry have included reports concerning congenital heart disease, acquired cardiac and pulmonary disease, poliomyelitis and anæsthesia. Gullickson *et al.*,[9] Montgomery and co-workers[10] and Bing[11] have observed the fall in oxygen saturation in patients with cyanotic types of congenital heart disease with exercise, and the delayed rise in oxygen saturation in these patients when breathing oxygen as compared with the rapid response in normal individuals. Godfrey and his associates[12] employed the Millikan oximeter in the study of cases with cardiac and pulmonary disease. Their results are in terms of the "oximeter response" when the subject changes from breathing room air to 90 to 97% oxygen. They noted that oximeter studies enabled a better assessment of the need and efficacy of oxygen therapy, and that anoxæmia was recognized which would otherwise have been overlooked. Elam and co-workers,[13] using the Millikan-Smaller oximeter, have reported on the usefulness of oximetry in studies of pulmonary function in poliomyelitis. They stress the high incidence of hypoxia in patients with acute poliomyelitis of spinal, bulbar, and bulbospinal types, and in convalescent patients, and noted that alveolar and ventilatory function could be assessed by oximetric studies.

With reference to the control of anoxæmia during surgical anæsthesia, McClure *et al.*,[14] using their oxyhæmograph, have graphically recorded relative changes in oxygen saturation, and have made observations on the effects of various anæsthetic agents on oxygen saturation of the peripheral arterial blood. In studies on anoxia tests for cardiac function, Pennys and Thomas[15] have demonstrated that the oximeter may be used to control the level of anoxæmia, and concluded that this was a more reliable procedure than having the patient breathe a gas with fixed oxygen concentration. The majority of the studies noted above were carried out with instruments which provided relative oxygen saturation percentages.

The oximeter,[5] Fig. 1, which has been employed in the determinations to be noted presently, has been developed as a joint project

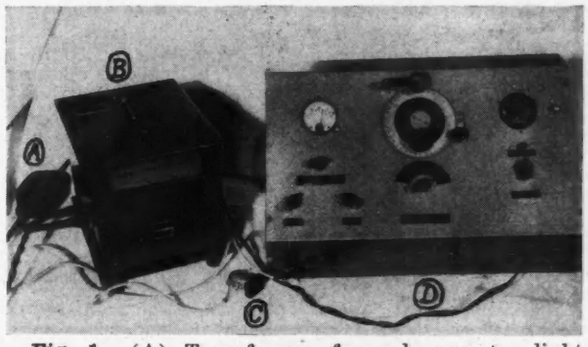

Fig. 1.—(A) Transformer for galvanometer light. (B) Galvanometer. (C) Millikan earpiece. (D) Oximeter. Power source is 115 volt A.C.

of the Department of Physiology, McGill University, and the Children's Memorial Hospital. It is based upon the same spectral properties as is the Millikan oximeter. It differs from the latter, however, with respect to its conception, electrical circuits and operation. The Millikan earpiece has been used. There are disadvantages to this earpiece, and if it is left on the ear for more than 25 to 30 minutes, it is possible to cause a 2nd degree burn. A new earpiece has been developed which will permit longer use without the hazards of a burn, is smaller, and may be fitted to the smallest ear.

This oximeter permits calculation of absolute values of percentage oxygen saturation. It is *not* necessary to preset the instrument with the patient breathing oxygen. The oxygen saturation percentage may be quickly obtained by the use of a nomogram, without the necessity of mathematical calculations. Changes in oxygen saturation are indicated immediately by the movement of the light beam on the galvano-

meter scale. If a normal subject is breathing room air when the earpiece is applied, an absolute value of oxygen saturation percentage can be determined. If a patient is suspected of having some degree of hypoxia or anæmia when the earpiece is first applied, the oxygen saturation may be known if the hæmoglobin level is determined. In a cyanotic patient with a right-to-left shunt, an absolute value can also be calculated if the hæmoglobin content of the blood is known. In subjects with a normal circulation the average accuracy of the instrument is ± 2½% as compared with the values obtained by Van Slyke analysis in a percentage saturation range between 40 to 100%. In patients with a right-to-left shunt the accuracy is approximately within ± 5%. The instrument can be used for coloured individuals.

VALUE IN ANÆSTHESIA

It will be quite apparent that the chief clinical use of the oximeter is in anæsthesia. By its means the anæsthetist may know from moment to moment the degree of oxygen saturation of his patient. This he knows only crudely without the oximeter, for the main indication he has of a reduced oxygen saturation is cyanosis.

A few examples may be cited to indicate the information provided to the anæsthetist. In

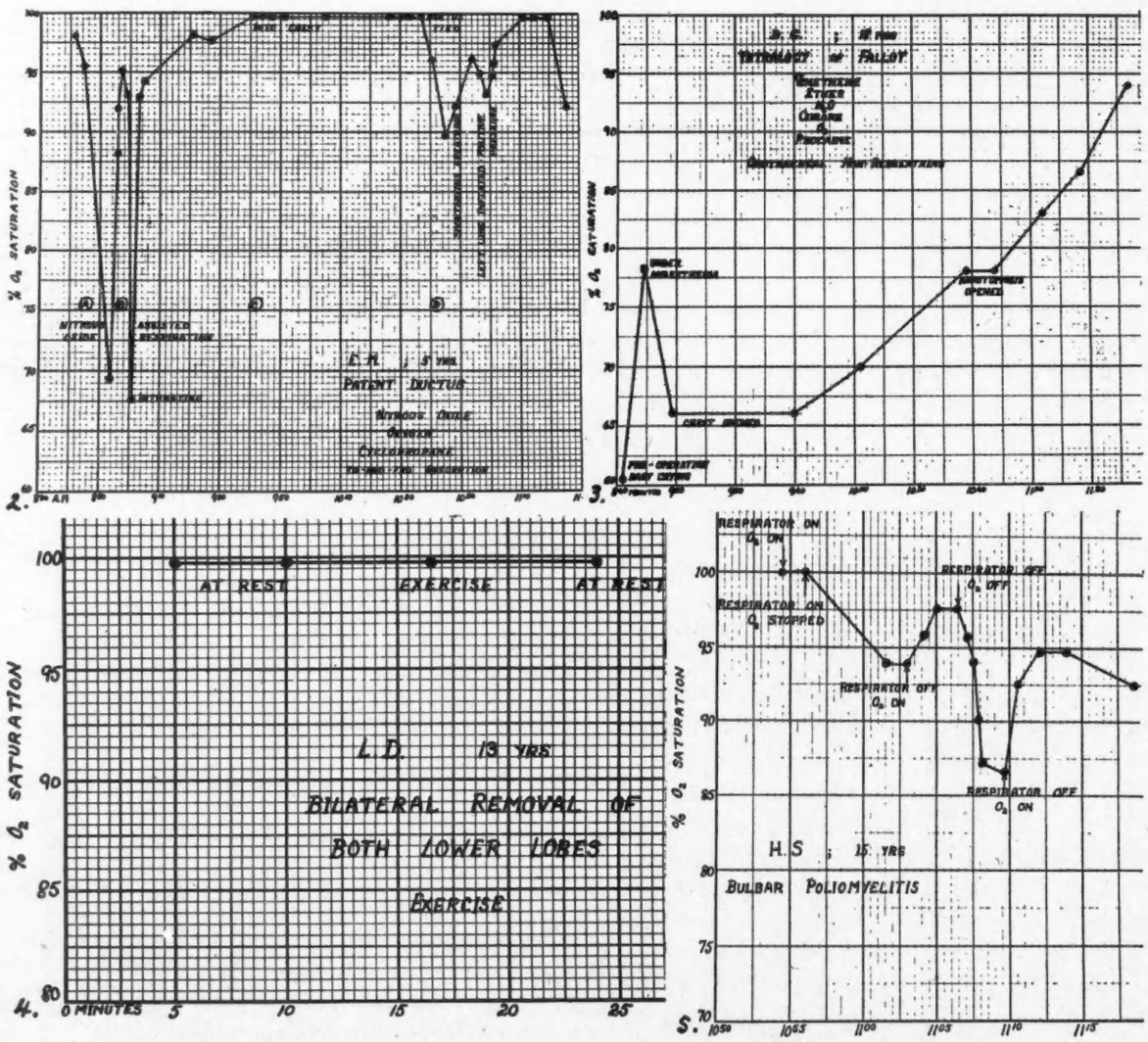

Fig. 2.—Between (C) and (D), when one lung was collapsed, arterial saturation remained at 100% when abundant oxygen was supplied and respirations were assisted. (A) During induction phase, note decrease in saturation when oxygen supplied is less than 20%. (B) Fall in saturation is due to spasm associated with endotracheal intubation. **Fig. 3.**—Note that under anæsthesia with added oxygen the oxygen saturation rises. After the Pott's anastomosis was opened the oxygen saturation rose rapidly. Oxygen was supplied continuously. **Fig. 4.**—Despite the absence of both lower lobes and the right middle lobe, full oxygen saturation was maintained during exercise. **Fig. 5.**—Note that adequate oxygenation could not be maintained without the aid of mechanical respirator.

thoracic operations the question has frequently arisen as to how well oxygenation can be maintained when one lung is collapsed. The data shown in Fig. 2 indicate that satisfactory oxygen saturation may be maintained in the peripheral arterial blood when high concentrations of oxygen are inspired and the patient's respiration is assisted. During operation for ligation of a patent ductus arteriosus, the left lung was collapsed, but normal oxygen saturation was maintained. It is of interest to note also that during induction with nitrous oxide, the oxygen level fell. This was due to there being less than 20% oxygen in the inspired mixture. There was a second fall in oxygen saturation associated with spasm during the endotracheal intubation.

The oximeter is of particular help to the anæsthetist during operations on patients with congenital heart disease of the cyanotic type. A patient aged 18 months with the tetralogy of Fallot, undergoing a Pott's type of anastomosis, showed changes in oxygen saturation illustrated in Fig. 3. It is observed that under anæsthesia with added oxygen the patient's arterial oxygen level is higher than that noted prior to anæsthesia. The level of oxygen saturation is fairly well maintained, despite the collapse of the left lung. Following the establishment of the Pott's anastomosis, the oxygen saturation rose in a very satisfactory manner. Oxygen was supplied continuously.

The oximeter can be of help in assessing postlobectomy cases. In the instance of a 12-year old boy, (Fig. 4) who had undergone bilateral removal of the lower lobes and the right middle lobe, it was easily demonstrated a few months postoperatively that during exercise he was able to maintain a normal oxygen saturation.

In the assessment of cases with congenital heart disease, the oximeter has been of value. Exercise tolerance may be measured objectively in terms of a fall in oxygen saturation. A patient, aged 12 years, with congenital heart disease of the cyanotic type, had an oxygen saturation of 73% at rest. While breathing oxygen the saturation percentage rose to 90%. It required 3½ minutes to demonstrate this maximal response. With light exercise the oxygen saturation fell rapidly to 57%.

The removal of a patient with bulbar poliomyelitis from the mechanical respirator is frequently fraught with difficulty. Considerable aid may be given by recording the percentage oxygen saturation when in the respirator and for any desired time after the patient has been taken out of it. Inasmuch as a patient frequently experiences marked apprehension and emotional instability when removed from a mechanical lung, this perfectly objective evidence of the efficiency of the patient's respiratory exchange is of help, both to patient and physician. In the case illustrated in Fig. 5, it was noted that adequate oxygenation could not be maintained for any length of time without the aid of the mechanical lung.

In any problem concerned with oxygen therapy, the oximeter will provide information regarding the need for oxygen and the efficacy of therapy.

It will readily be appreciated that the oximeter has a wide clinical use. The cases cited are examples of how it may be employed, and many other instances come readily to mind. It has great value in teaching the principles of oxygen unsaturation and oxygen therapy. Many investigative problems become possible or are facilitated through its use. At the present time the drawback of the instrument described is that it is a delicate apparatus and must be operated by a trained technician. An instrument is now being completed which is similar in principle but rugged in construction, and with an electronic calculator incorporated which it is hoped will provide a direct reading of the percentage oxygen saturation.

We wish to express our appreciation to Miss Carol Horsborough, Mrs. Joan Oliver, Miss Lesley McBride and Miss Nancy McGill for technical and secretarial assistance which has facilitated these studies.

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STUDIES OF THE INHERITANCE OF DIABETES MELLITUS*

1. The Relation of Heredity and the Age of Onset of Diabetes

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WHILE heredity is recognized as a factor of major etiological importance in clinical diabetes mellitus, the exact mode of inheritance of the disorder as well as the character of the innate susceptibility to the development of the disease is imperfectly understood. In view of the practical implications pertaining to the genetical aspects of diabetes, the subject merits consideration.

The existence of diabetes in one or more relatives appears in the records of approximately 40% of diabetic patients as compared with about 18% of non-diabetics. Several observers[1, 2, 3] have noted a higher incidence of positive family histories of diabetes among diabetics in the younger than in the older age groups. A debatable question concerns the existence of two separate types of diabetes, namely, juvenile and adult forms of the disease. Practically, certain characteristic differences distinguish diabetes mellitus in the young as contrasted with that in the elderly patient. Apart from the well known clinical variations, apparently, no data of a fundamental biological nature have evolved substantiating the concept of two distinct varieties of diabetes separable on the basis of the age of the affected individuals at the time of the development of the abnormality.

Although the evidence in favour of the inheritable potentiality for acquiring diabetes is conceded, a fixed pattern of inheritance has not been established. The existing confusion in this regard is understandable when one considers the many possible secondary and modifying factors which may influence the manifestation of the disease. Gates[4] expressed the following opinion based upon a review of the literature: "Diabetes mellitus follows the usual law, the recessive form being severe with early onset, the dominant form having at least a later age of onset and generally milder symptoms". Similarly, Harris[5] suggested dominant inheritance; the milder cases with late onset being heterozygous and the severe cases with early onset, homozygous. The same author[6] suggested also a recessive inheritance for the juvenile subjects in whose parents he noted an unusually high incidence of consanguinity (cousin marriages).

The purpose of this communication is to present evidence indicating that the so-called "juvenile" and "adult" types of familial diabetes mellitus behave genetically as forms of a single graded character rather than as two distinct entities. In conformity with the terminology employed by Harris, the word "juvenile" is used to designate a patient whose diabetes became manifest before the age of 30 years, while "adult" refers to a patient in whom the disease began after the age of 30. This is, admittedly, a purely arbitrary classification adopted solely for the convenience of the project in hand.

THE INVESTIGATION

The relation of heredity and age of onset of diabetes was studied in a random series of 1,380 patients (563 males and 817 females) observed since September, 1944. The ages of these individuals at the onset of their diabetes ranged from 14 months to 83 years. The number of patients with onset of the diabetes in each decade is shown in Fig. 1. A positive family history of diabetes was obtained in 50% of the males and 51% of the females. The data pertaining to the family histories were acquired through personal interviews with the patients and/or their near relatives, from hospital records and by questionnaires.

Owing to the uncertainty of specifying the exact time of the earliest development of the diabetic state in any individual, it was necessary to assume for the purpose of the present investigation that the age at onset coincided approximately with the age at the time of the establishment of the diagnosis of the diabetes. Thus, the "age at onset" as used here refers to the age at which the disease was first

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definitely recognized. It is realized that this simplification of the relevant circumstances introduces a potential error into the results; an error that is greater in the older than in the younger age groups since the initiation of diabetes usually is more abrupt in children than in elderly subjects. The usage is believed to be tenable, however, because the error is always in the same direction and thus the general trend is not disturbed. The percentage of cases with a positive family history, *i.e.*, with at least one known diabetic relative, was calculated according to each decade of onset age.

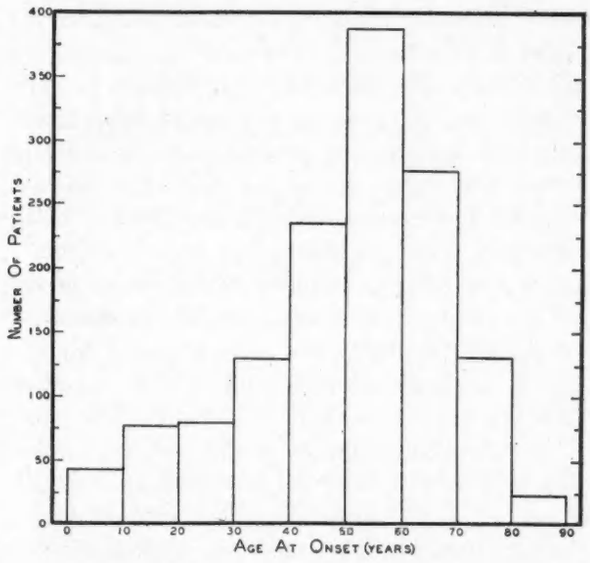

Fig. 1.—The age at onset of diabetes mellitus, by decades, of 1,380 patients.

THE OBSERVATIONS

The results depicted graphically in Fig. 2 show that the percentage of patients, each with a known positive family history of diabetes, falls gradually from 79% in those with onset age 0 to 9 years to 26% in the group with onset age 80 to 89 years. An exception to the general trend is seen in the second decade, in which the percentage positive (54) is unexpectedly low. This discrepancy is more pronounced in the females than in the males.

The expressed incidence of positive family histories indicated in Fig. 2 may be subject to at least four sources of error, *viz.*:

1. *Differences in the mean age of relatives.*—Since diabetes is more prevalent in middle-aged and elderly persons than in young people, the incidence of positive family histories would tend to vary directly with the mean age of the relatives. Thus, if the mean age of the relatives were greater for the juvenile than for the elderly diabetics, an increased incidence of positive family histories would be expected in the former. It is doubtful, however, if any such correlation prevails, but this point is an object of inquiry and will be referred to in a subsequent communication.

2. *Vagaries of factual information pertaining to relatives.*—Again, there seems no reason to believe that young diabetics or their parents possess more precise and accurate knowledge of the health records of their relatives than do older patients. Contrariwise, often the most complete and detailed family histories are obtainable from the more mature individuals.

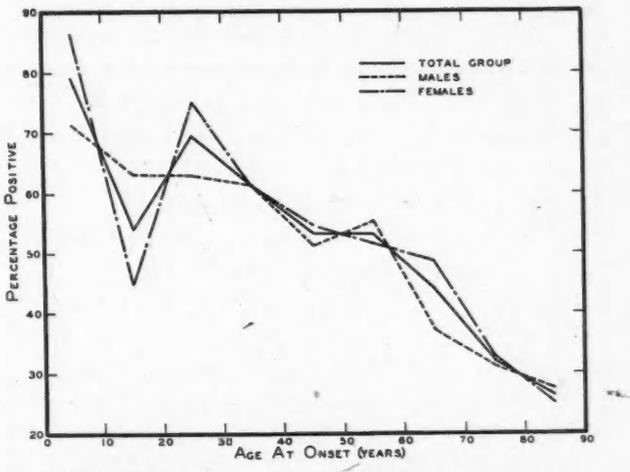

Fig. 2.—The percentage of diabetic patients with a positive family history of diabetes, as related to age at onset.

3. *Degree of accuracy of the diagnosis of diabetes in the relatives.*—It is quite probable, in some instances at least, that unidentified diabetes existed in antecedent and collateral family members in the absence of authentic medical information. The reverse is also possible since hearsay evidence is always unreliable. However, such fallacies are applicable to the younger and the older individuals of the series alike.

4. *Changing birth rate and reduction in family size.*—Since the birth rate has declined steadily during the years representing the lives of individuals included in this survey, the older patients have, on the average, a larger number of sibs than the younger patients. Thus the chance of diabetic sibs is less, other things being equal, in the younger than in the older subjects. This factor would operate in the reverse direction to the trend shown in Fig. 2.

There seems little reason, therefore, to presume that the differences shown in Fig. 2 are apparent rather than real, and the indication is that the percentage of diabetics with a positive family history of diabetes varies inversely with the age of onset of the diabetes.

The data pertaining to the relation of heredity to the onset age of diabetes in the present series have been analyzed in another way. The percentages of all the diabetics under consideration with onset by stated ages have been plotted and compared with similar figures for those diabetics with: (*a*) negative family histories, (*b*) positive family histories in general and (*c*) bilateral positive family histories (*i.e.*, both paternal and maternal relatives affected).

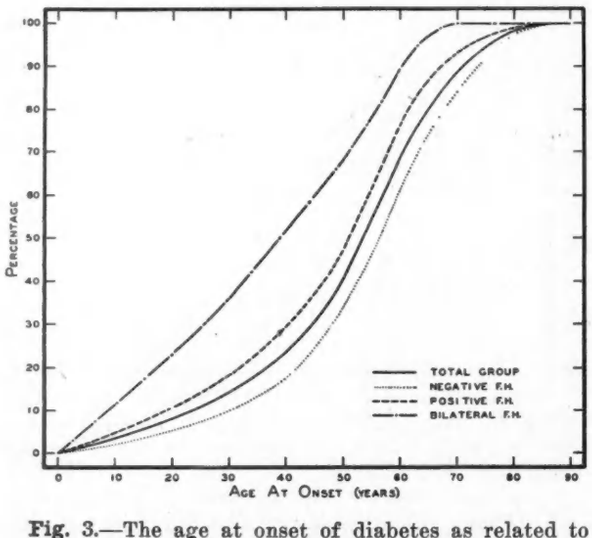

Fig. 3.—The age at onset of diabetes as related to a family history of diabetes. Cumulative percentages based upon a total group of 1,380 cases; 672 with a negative family history, 708 with a positive family history and 79 with a bilateral positive family history.

The findings as presented in Fig. 3 show that, as compared with the total group in which the mean age at onset is 50.4 years, the onset age is latest for the patients with a negative family history, earlier for those with a positive family history and earliest for those with a bilateral positive family history. The mean age at onset was 53.8 years for the negative, 47.3 years for the positive and 33.1 years for the bilateral positive groups respectively. The differences between means are statistically significant in all instances. Thus the presence of familial diabetes not only increases the likelihood of the kindred eventually developing the disorder, but also favours its development at an earlier age than would otherwise be the case; and, if the diabetes be present in both paternal and maternal lines, the hereditary influence on the age of onset apparently is intensified.

Discussion

A completely adequate explanation of the association between heredity and the onset age of the diabetes referred to above is not immediately forthcoming. The development of frank diabetes may be envisaged as the result of the interaction of two main pathogenic agencies—an hereditary predisposition plus an instigating factor. The effect of heredity upon the onset age in individuals of particular genetical constitution is indicated in both Figs. 2 and 3. One might postulate that in certain individuals the hereditary proclivity is sufficiently active that a comparatively minor aggravating influence or one of short duration causes the early development of the disease; whereas in others the hereditary element, being relatively weak, requires for its expression a greater or more prolonged exhibition of stress.

This concept permits a possible explanation for the unexpectedly low percentage of positive family histories among females with onset of diabetes during the second decade. The state of hormonal unbalance at this period reasonably might represent the stress factor capable of initiating the diabetes in individuals with a comparatively mild inherited potentiality to the acquirement of the disease.

Although the precise mode of inheritance of diabetes is as yet inconclusive, the evidence for recessive inheritance of the primary gene concerned, originally suggested by Pincus and White,[7] continues to accumulate.[6, 8] However, recessive inheritance alone does not explain the apparent graded behaviour of the character.

It is anticipated that from large-scale, long-range investigations of this kind, it will be possible eventually to clarify not only the mode of inheritance of the genetical susceptibility to diabetes mellitus, but also the reasons for the variability of its expression.

Summary

1. The inheritance of diabetes mellitus has been studied in 1,380 diabetic patients.

2. The percentage of these patients with positive diabetic family histories varied inversely with the age of onset of the disease.

3. As compared with the total group, the onset age was latest for the diabetics with nega-

tive family histories, earlier for those with positive family histories and earliest for those with bilateral positive family histories of diabetes.

4. It is concluded, therefore, that diabetes mellitus behaves genetically as a graded character. This opinion is in disagreement with the view that juvenile diabetics are homozygous and older diabetics heterozygous.

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URINARY CALCULI ASSOCIATED WITH RECUMBENCY

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WOUNDS incurred in World War II necessitating prolonged immobilization have provided an excellent opportunity to study the effects of recumbency upon the urinary tract. The development of urinary calculi in such conditions as fracture of the spine with spinal cord injury, fracture of the femur and pelvis, wounds and infection of the lower extremities resulting in prolonged immobility, has attracted considerable attention. This has led to a comprehensive study of the essential factors responsible for this type of stone formation and to the development of preventive measures which to a great extent have succeeded in limiting this complication.

The rôle of prolonged immobilization associated with bone injury or other chronic disease has been stressed by numerous observers, although the literature on this subject prior to the early '30s has been scant. Pyrah and Fowweather[1] reported 7 cases of recumbency calculi and gave a comprehensive account of the morbid anatomy, etiology and preventive care. Goldstein and Abeshouse[2] reported 14 cases in patients with chronic bone disease. More recent reports by Carlson and Ockerblad,[3] Leadbetter and Engster,[4] Fett and Kane[5] and others further exemplify this condition. Flocks[6 to 9] has demonstrated the relationship of calcium urolithiasis to prolonged immobilization associated with trauma, and has added considerably to our knowledge of this subject.

This paper reports the incidence and treatment of recumbency urinary calculi in cases of injury of the lower extremities, pelvis and spine treated at the Deer Lodge Veterans' Hospital in Winnipeg. Included in this group are those traumatic paraplegic cases in whom calculus formation was considered primarily postural in origin. Obviously this does not include all cases of stone in paraplegics. Vesical calculi are excluded because other more potent factors contribute to their formation. Over 1,500 case histories were examined dating from mid 1943 to mid 1948. These patients were immobilized for varying periods in splints or in plaster and in the case of spinal cord injury, immobility was caused by paralysis. About 500 of these were immobilized for a period of more than 6 weeks either overseas or in Canada. Exclusive of paraplegics 18 cases of stone were noted: 15 occurred in fracture of the femur, 12 of these being compound. There were 60 cases of fracture of the spine with injury to the spinal cord of whom 7 developed recumbency stones. This makes a total of 25 cases. It is noted that the incidence of stone was at its height during the early part of this period and receded during the latter part. This may be accounted for by the institution of improved methods of prophylactic care.

FACTORS RESPONSIBLE FOR STONE FORMATION IN RECUMBENCY

(*a*) *Anatomy.*—The anatomy of the urinary tract favours stasis when the patient is flat on his back. The hilum of the kidney is directed forward and medially, thus there is a tendency for a reservoir to form in the pelvi-calyceal system. In the recumbent patient the upper calyces are just as dependent as the lower ones, therefore they are as liable to become the site of stone formation. In the upright position the lower calyces are situated below the outlet of the renal pelvis, consequently this constitutes the commonest site of stone formation in ambulant individuals. The line of the ureter in the recumbent patient slopes upward from the renal fossa to the pelvic brim adding to the difficulty of urinary drainage. Paralysis of musculature of the urinary tract, which may occur in spinal cord injury also militates against free and unimpeded drainage.

It is known that urine is a supersaturated solution in regard to stone-forming salts. These salts are held in solution by the action of colloids. Prolonged immobilization with resultant stasis may create sufficient disturbance in the colloid balance to cause precipitation of the urinary salts.

(*b*) *Mobilization of calcium salts from bone.*—Following a fracture the local inflammatory reaction results in decalcification of the fracture ends. The degree of this process varies greatly but is relatively smaller than the effects of attendant immobilization of the fractured limb. For instance, decalcification following the insertion of a Smith-Petersen pin is not as great as that produced by external fixation in a Whitman spica. Osteoclastic resorption of bone due either to reaction to trauma or immobilization, results in liberation of calcium salts. This is not sufficiently rapid to produce hypercalcæmia, but increased excretion in the urine is noted during an early phase of this process.

(*c*) *Hypercalcinuria.*—Increased calcium excretion in the urine occurs within a few days following the institution of recumbency and persists for approximately 6 to 12 weeks. This is produced by mobilization of calcium from bone. After several months an equilibrium is reached whereby urinary calcium excretion returns to normal in spite of immobilization. From this point on urinary calcium is no longer a factor in stone formation. During the period of hypercalcinuria, the urine is saturated with relatively insoluble calcium salts and precipitation of small amounts of these salts may occur. If conditions are unfavorable for removal of these small precipitations a renal stone may form.

In the normal individual under constant conditions, the daily excretion of calcium in the urine is remarkably stable.[10] Variations may occur in virtue of alterations in the intake of calcium, phosphorus and vitamin D. In the normal person under wide variations of dietary and vitamin D intake, the urinary calcium varies only from 90 to 350 mgm. per 24 hours. In conditions of prolonged recumbency, with or without fracture, even with low intake of calcium and phosphorus, the urinary calcium may be over 480 mgm. per day.

John E. Deitrick[11] has made an interesting study upon the effect of immobilization on calcium metabolism of normal men. Experiments with oscillating beds used in the treatment of peripheral vascular disease resulted in a diminished urinary excretion of calcium compared to the fixed bed. Serious effects did not manifest themselves until after 2 or 3 weeks of immobilization. The total losses of calcium were more than half the values that have been found in fracture cases. In other words immobilization in casts may account for half or more of the calcium loss during the treatment of a fracture.

(*d*) *Urinary tract infection.*—Urinary tract infection is not an essential factor in the formation of recumbency calculi. The presence of infection however, will hasten stone formation and influence the progress and prognosis of the case. Infection may be carried to the urinary tract from a distant focus or more likely by instrumentation. Infection may produce a nucleus of bacteria, debris and epithelial desquamation to which crystalloids from the urine adhere to form a stone. Infection with urea-splitting organisms may cause precipitation of calcium salts by maintaining a high urinary alkalinity.

(*e*) *Urinary pH.*—A very potent factor favouring the precipitation of calcium phosphates which are the principal constituents of recumbency calculi is an alkaline reaction of the urine. Both dicalcium phosphate, $Ca_2(HPO_4)_2$ and tricalcium phosphate $Ca_3(PO_4)_2$ are thus precipitated. An acid reaction will tend to keep the calcium phosphate in solution as the soluble monocalcium salt. $Ca(H_2PO_4)_2$. Even after precipitation these salts may be redissolved if a strong acidity is produced.

MECHANISM OF STONE FORMATION

Multiple small precipitates of calcium phosphate form in the calyces and the pelvis of the kidney, and resemble the precipitates of sulfathiazole and sulfadiazine. Many tiny concretions may thus be formed during the early period of recumbency. This is known as "calcium sand". These small particles may fuse to form pasty masses deposited in the calyces and pelvis. These are referred to as "mud stones" or "calcium mud" (Figs. 4, 6 and 8) and may form complete casts of one or more calyces or of the entire pelvis and calyces. The appearance often resembles a normal pyelogram in a well prepared patient. Such a mass is loosely packed, is not attached to the

pelvis or calyceal mucosa, and is liable to disintegrate when touched with a ureteral catheter, or by other disturbances such as abrupt changes of position or increased activity. Such aggregations form the nuclei upon which true calculi can develop if retained in the calyceal system or pelvis for any length of time. The stone that forms is not a solid hard object but a soft mushy concretion which is liable to crumble during attempts at surgical removal. It consists mainly of calcium phosphate.

Interval between injury and onset of urinary symptoms.—Deposits may occur very early in recumbency, particularly if fluid administration is inadequate. In the majority of cases months have elapsed before the condition is discovered. This condition probably goes unrecognized during its early phase because of lack of symptoms and lack of investigation. In this series the shortest interval between the injury and x-ray evidence of stone formation was 2 weeks (Case 4).

Clinical features.—In most cases there is no early symptomatology because precipitation is a gradual process and lack of mobility delays the onset of such symptoms as hæmaturia and colic. The first symptom is usually hæmaturia, either gross or microscopic. The passage of a small stone down the ureter may induce an attack of colic. If infection sets in, obstructive pyelonephritis may result.

These stones are usually rapid in their growth and may cause extensive irreparable renal damage before a diagnosis has been made. Because of the lack of symptomatology, early diagnosis is best made by frequent x-ray examination of the urinary tract.[8]

TREATMENT

1. *Prophylactic care.*—(*a*) *Fluids* should be forced by mouth or if necessary intravenously to maintain an adequate urinary output. This tends to counteract stasis, dilutes the concentration of calcium, making precipitation less likely, and minimizes the possibility of urinary infection. A minimum daily output of 2,000 c.c. is considered satisfactory.

(*b*) *Diet.*—The diet should be rich in vitamin A and B in order to improve epithelial nutrition. An acid ash diet should be given to help maintain urinary acidity. Such a diet contains a high proportion of meat, fish and cereals.

(*c*) *Urinary pH.*—The maintenance of urinary acidity tends to keep calcium phosphate in solution. Dietary measures alone may be insufficient. Dilute HCl is an effective acidifier and may be administered with meals: pH should be checked every morning with nitrazine paper. In cases of established urea-splitting infection, attempts at acidification usually fail and other measures are taken.

(*d*) *Control of stasis.*—A definite routine should be instituted whereby the patient is moved from one position to another. He should be tilted to one side or turned to the prone position at frequent and regular intervals. In this way the gravitational effects of recumbency are overcome.

(*e*) *Control of infection.*—A urinary tract subject to stasis and to the debilitated state of a recumbent patient is prone to infection. The armamentarium at our disposal to combat infection is now greater than ever before. With proper bacteriological control and sensitivity tests, appropriate treatment may be instituted with such drugs as the sulfas, penicillin, streptomycin, aureomycin, etc. It must be remembered that drug treatment alone will not suffice unless proper drainage is instituted.

(*f*) Frequent urinalysis should be done and stone should be suspected in case of persistent presence of red blood cells.

(*g*) Frequent x-ray examinations should be carried out even in asymptomatic patients with a view to detecting early stone formation.

2. *Treatment proper.*—All measures referred to under prophylaxis are applicable to active treatment.

If the stone is recognized before consolidation has occurred, its disintegration and passage may be effected by conservative measures. Irrigation of the renal pelvis and calyces with G solution[12] through an indwelling catheter may be carried out by a continuous drip or by simple hand irrigation. While a ureteral catheter may be maintained *in situ* a week or longer, the kidney is peculiarly vulnerable to infection during such an interval. Necessary aseptic precautions should be taken and the catheter removed in case of undue irritability, constitutional reaction or evidence of infection. Two No. 6F. catheters are introduced into the ureter, G solution being run into one and drained out through the other. The stone is thus continuously bathed in G solution without

increase of intrapelvic pressure. This method has proved successful in practically all cases where the stone has not gone beyond the stage of calcium mud or sand. Disintegration of established calcium phosphate stones will occasionally occur with this type of treatment, but the risk of renal damage during its application limits its usefulness.

Adequate urinary drainage is the cardinal principle of treatment. Obstructive uropathy should either be bypassed or surgically removed.

Surgical removal of calcium phosphate renal calculi is often difficult and at times impossible to effect completely. In such cases a nephrostomy tube should be left *in situ* and the method of either continuous or intermittent irrigation be used to disintegrate and wash out the remaining fragments of stone. If the stone is limited to a single calyx, calycectomy may be preferable to lithotomy. Nephrectomy is indicated where the condition is limited to one kidney and where there is advanced renal damage and infection.

Of the 25 cases noted, 4 illustrative cases are herewith reported.

CASE 1

A.E.R., male, aged 29, was wounded in Holland October, 1944, by shrapnel. He sustained a compound fracture of the right femur and was immobilized for approximately 12 weeks. He was admitted to Deer Lodge Hospital February, 1945, with malunion of the fracture.

He gave a history of hæmaturia within a few weeks of his accident. Urinalysis on admission revealed 8 to 10 red blood cells per high power field (centrifuged specimen). Serum calcium was 11.5 mgm. % and serum phosphorus 3.6 mgm. %. X-ray examination March 13, 1945 (Fig. 1) revealed multiple shadows in the region of the left kidney.

On March 16, a catheter was inserted into the left ureter and intermittent irrigation with "G" solution was carried out at 4 hour intervals for 4 days. X-ray examination April 2, revealed evidence of disintegration. Pelvic lavage was repeated on 3 further occasions. X-ray on June 7, (Fig. 2) showed that the calculi had further broken up and passed down the ureter. In view of the obstructive uropathy the left kidney was explored. The entire surface of the kidney was studded with small abscesses and nephrectomy was necessary.

This case illustrates the risk of infection and damage by the prolonged use of an indwelling ureteral catheter.

CASE 2

G.A.M., male, aged 30, was wounded by machine gun fire in Belgium October 2, 1944. He sustained a compound fracture of the left femur and left tibia and was immobilized for more than 2 months. He was admitted to Deer Lodge Hospital on March 23, 1945 with osteomyelitis of the left femur.

He gave a history of right renal colic followed by passing a stone in December, 1944. The admission urinalysis was negative. Routine x-rays of the kidneys and bladder on April 20, 1945, revealed an opaque shadow in the right kidney filling all the minor calyces. Serum calcium was 12 mgm. % and serum phosphorus 4.1 mgm. %. He was started on routine treatment. X-rays taken May 15, with a ureteral catheter *in situ* revealed a similar picture to the previous examination (Fig. 3). Lavage of the renal pelvis with "G" solution through a ureteral catheter was carried out at hourly intervals for a period of 4 days. X-rays taken June 19 (Fig. 4), revealed no evidence of stone. Intravenous pyelography showed that both kidneys were normal regarding structure and function; and urinalysis was negative.

This case provides an illustration of calcium mud.

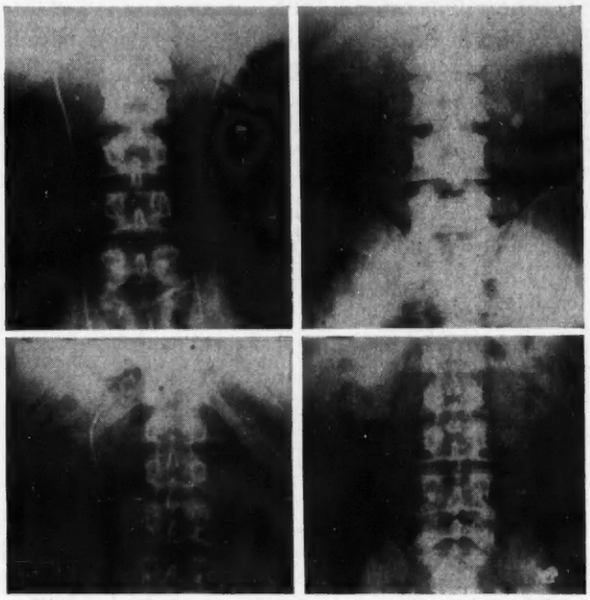

Fig. 1. (Case 1).—X-ray 5 months after initial injury showing multiple calculi in left kidney. **Fig. 2.** (Case 1).—After irrigation with "G" solution the stones have broken into smaller particles and have migrated from the kidney to the ureter, giving rise to obstruction. **Fig. 3.** (Case 2).—X-ray more than 7 months after initial injury showing opaque shadow filling the minor calyces of the right kidney. **Fig. 4.** (Case 2).—X-ray following pelvic lavage with "G" solution shows complete disappearance of shadow in right kidney.

CASE 3

L.J.H., male, aged 30, was wounded in France by a high explosive shell on September 25, 1944. He sustained a compound fracture of the lumbar spine with cord damage, hæmo-pneumothorax and multiple flesh wounds. He was immobilized for a period of 6 weeks and admitted to Deer Lodge Hospital January 16, 1945.

X-ray of the spine January 18, revealed an opacity filling the pelvis and calyces of the right kidney (Fig. 5). He was started on routine treatment. X-ray examination February 14, revealed complete disappearance of this shadow (Fig. 6) and intravenous pyelography showed a normally functioning kidney. In view of a subsequent flare up of urinary infection and left loin pain, intravenous pyelography was repeated on May 30, 1945. This revealed a normal right kidney but the left kidney failed to visualize. There was a calculus in the left ureter at the level of the 4th lumbar vertebra. This was surgically removed. There have been no recurrences to date.

Fig. 5 is an excellent illustration of calcium mud.

CASE 4

H.C.W., male, aged 22, was injured in a car accident in Canada, August 31, 1945. He sustained a fracture of the right femur and was immediately admitted to Deer Lodge Hospital. Following two weeks of immobilization he developed left loin pain with hæmaturia. X-ray on September 15 (Fig. 7) revealed an opaque shadow filling the calyces of the left kidney. Routine treatment was started. X-ray taken two months later

(Fig. 8) showed that this shadow had disappeared leaving a small residual opacity.

This case presents an example of calcium mud although the remaining shadow is obviously a fully-formed stone. There is an interval of only 2 weeks from the time of injury to x-ray evidence of stone formation.

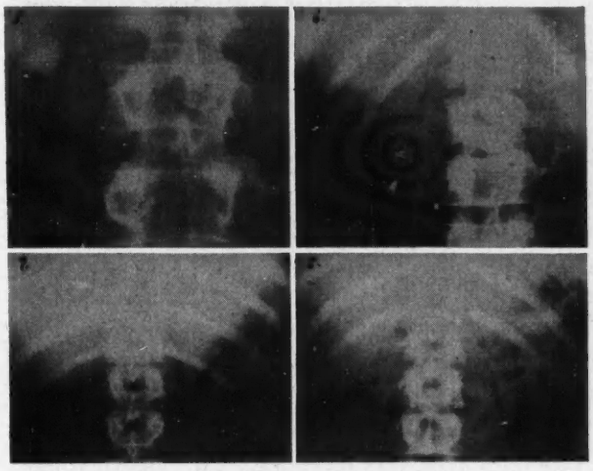

Fig. 5. (Case 3).—X-ray of the lumbar spine less than 4 months after initial injury reveals an opacity filling the pelvis and calyces of the right kidney. **Fig. 6.** (Case 3).—X-ray less than a month after Fig. 5, following routine treatment shows complete disappearance of the shadow. A calculus is shown in the left ureter at the level of the 4th lumbar transverse process. **Fig. 7.** (Case 4).—X-ray 2 weeks after initial injury reveals an opaque shadow filling the calyces of the left kidney. **Fig. 8.** (Case 4).—X-ray after routine care including pelvic lavage reveals disappearance of the shadow with persistence of a small residual opacity.

SUMMARY

Twenty-five cases of urinary calculi were observed and studied, resulting from prolonged immobilization associated with skeletal trauma. Four illustrative cases are reported.

Factors facilitating stone formation are reviewed. These include a discussion of the dynamic anatomy of the collecting system of the kidney, the mobilization of calcium salts from fractured bone, and the effect upon urinary excretion of calcium produced by immobilization unassociated with other disease.

A very important clinical feature is the lack of early symptomatology. Frequent roentgenographic examination of the urinary tract is necessary for early diagnosis.

Treatment, both prophylactic and curative is outlined.

CONCLUSION

Calculus formation produced by prolonged immobilization is a preventable complication. Early diagnosis before the onset of symptoms, while the stone is still a mushy concretion, will enable the administration of curative measures before an established calculus has been formed.

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ACUTE NUTRITIONAL DISTURBANCE IN YOUNG INFANTS ASSOCIATED WITH MASTOIDITIS*

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IN the period around 1927 certain articles appeared in the medical literature on the relationship of mastoid disease in infants to generalized systemic disturbance and nutritional states associated with vomiting, diarrhœa, dehydration and toxæmia. Dean[3] and Marriott[1] were two of the main proponents of this idea. Their argument was so conclusive that there was some question whether mastoid infection was the main cause of intestinal intoxication or not. Many cases of intestinal intoxication which came to post mortem had mastoid infection, and the question was whether the toxæmic, dehydrated state of the child had made it a suitable host for the development of mastoid infection, or whether the mastoid came first in a form that was not recognized clinically.

A team of investigators at the Hospital for Sick Children carried on a study over a period of three years at that time. It was definitely established that most of the cases of intestinal intoxication were suffering from intestinal infection of pathogenic organisms, and the secondary parenteral infection arose during the course of treatment, probably as a cross infection in the hospital. One of the co-authors of this present paper (D.E.S.W.) in his conclusion at that time stated "Infection of the mastoid antrum is not the cause of intestinal intoxication in in-

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fants''.[2] Our subsequent experience has borne this out. However, Marriott and Dean must have had some justification for their conclusion. The study presented in this paper shows the dramatic results in a selected group of patients that fell into the type of condition which Dean described.[3]

With better hygiene, the increased knowledge of acid base metabolism and water balance bringing about better treatment of dehydration and toxæmia, and with the advent of antibiotics ''intestinal intoxication'' has largely lost its place as a major problem. The main problem of this type is acute dehydration and toxæmia following parenteral infection. Whereas previously many of the patients with intestinal intoxication were hydrated, then developed parenteral infection and died, now there are very few admitted and the sequelæ from secondary infection are largely prevented.

We have been impressed by a few patients who were resistant to treatment. In these, in spite of the usual methods of hydration, supplemented with antibiotic drugs, the hydration has not improved, the toxæmia remained or became worse, and the digestive disturbance, *viz.*, vomiting and diarrhœa, continued. In these it was observed that the ears did not appear normal. In the ordinary course of events myringotomy would not be performed because the drums usually did not appear too abnormal. Paracentesis of the drum usually produced some serous fluid or pus. Because of the poor reactions of the patient and the abnormal signs which are described below, mastoidectomy was performed. In the fourteen cases here studied, evidence of mastoid involvement was found in one or both mastoids. This was followed by clinical improvement with a decrease in the number of stools, improved hydration in all but two cases—one died shortly after operation, possibly from aspiration of a feeding; the other patient was in a very poor clinical state when the mastoidectomy was done, and there was no improvement.

There were fourteen cases with almost the identical train of symptoms in all the cases, except for the age. The digestive symptoms were vomiting, refusal of food, diarrhœa, dehydration and toxæmia. These did not react to the usual methods of treatment—intravenous, hypodermoclysis, transfusions, the use of sulfadiazine, penicillin and streptomycin. Examination of the child revealed no other cause of continuation of the condition with the exception of some abnormality of the ear. As a result of this, aid of the otolaryngologist was sought. We were looking for so-called ''hidden mastoid''. The findings that are used to aid in this diagnosis are given in the next sections (contributed by D.E.S.W.).

Local physical signs.—The eardrums of a small baby are extremely hard to see. The otoscope must give a brilliant illumination and the speculum used should be as large as the canal will admit. Very great gentleness is required. Undue pressure with the aural speculum will cause pinkness or redness of the roof of the external auditory canal, which may spread on to the drum and also may arouse injection of tiny vessels along the handle of the malleus. These discolorations can cause errors in diagnosis.

The eardrum of the infant is almost on the outside of the skull and is much more horizontal—or to put it in other words, much less vertically oblique than the drum of a child two years old. Three landmarks should be looked for—the light reflex, the short process of the malleus, and the handle of the malleus. The drum should have a good lustre, be of a light bluey-grey colour and be without redness or bulging. The absence or alteration of any of these landmarks and characteristics should arouse the keen interest of the examiner.

Wax or debris in the external meatus should not be removed with an instrument. It should be meticulously and very gently removed by repeated syringing with warm saline or warm soda solution. A glass eyedropper with an unbroken tip is the best syringe. The solution must be expressed into the canal and sucked back into the eyedropper. The task is not easy and can only be entrusted to a nurse or physician of great patience. The aim should be to get the ear canal perfectly clean without having altered the normal colour of skin or eardrum in the slightest degree. This cleaning is extraordinarily difficult, and in some cases may take a competent specialist half an hour.

It is a frequent occurrence for a consultant to be asked to express an opinion on an infant whose ear canal and drum have been made very abnormal in appearance by the well-meant but misdirected efforts of less skilled hands. The consultant frequently will spend much time cleaning the ears and then give orders that the ears are not to be looked at for 24 hours, until

the possible trauma has had an opportunity to subside so that he can express an opinion regarding the eardrum.

At this second visit he will look for the above-mentioned landmarks and characteristics. Dullness of the drum, and/or absence of the light reflex indicate blockage of the Eustachian tube or retraction of the drum head. Redness of the drum will suggest congestion of blood vessels of the middle ear; bulging of the posterior half of the drum—swelling of the lining of the middle ear or fluid; whiteness or yellowness of such a bulge—purulent fluid in the middle ear. Inability to see either the short process or the handle of the malleus indicates swelling of the drum or bulging of the drum from fluid or swollen mucosa. Depression of the roof of the canal near the drum indicates swelling or œdema which in turn is usually secondary to inflammatory reaction in the mastoid antrum, and its adjacent air cells.

For some years we have never found an inflammation of the mastoid antrum without changes in the eardrum. However, considerable abnormality may be present in the drum without mastoiditis being present. These signs are evidences of some abnormality in the middle ear, but they are not signs usually associated with classical mastoiditis of which we have many examples in the same age group. In the usual mastoiditis there has been a period of otitis media with a discharging ear, later the auricle is pushed down, out and forward by swelling of the post-aural tissues which comes from infection extending through the outer table of the temporal bone, about the level of the external boney meatus.

In the group of cases which we are discussing the evidence of extension through the bone is lacking. In many, myringotomy had not been performed prior to operation, and in those in which it was done the discharge from the ear was usually not startling. The decision to operate on the mastoids usually is arrived at by consultation with the otolaryngologist and the pædiatrician. The pædiatrician's problem is that he is dealing with a child who is not reacting to treatment and is obviously getting worse. In many instances these patients were almost, if not, moribund. The otolaryngologist states that the ears do not appear normal. Because no other cause can be found to explain the lack of improvement, the mastoids are explored. There have been a few non-involved mastoids explored, but the results in this series justify the occasional error that may be made.

Other aids to diagnosis of this condition have been suggested. One was the use of a trochar and cannula to ascertain the presence or absence of pus in the mastoid antrum. In an unpublished series it was shown that this method was quite unsafe, as the mastoid antrum in the infant varied greatly in position and size, and important structures could be damaged by this blind procedure. One author[4] states that enlargement of the glands in the posterior triangle of the neck is a useful sign. In the great majority of our series of cases this sign was not found.

Note on incision of the eardrum.—Incision of the eardrum in infants is performed much less frequently than it was in the "twenties". At that time Dean[3] bore witness to its great value where indicated. Whenever therapeutic measures are failing to arrest the downward progress of an infant, extra special attention should be given to the ears. Paracentesis in such cases is performed on relatively slight indication. It often abruptly alters the course of an illness. It is sometimes thought that if pus fails to appear the incision has been useless. This is a fallacy. A normal drum cuts almost with a "ping"; because the normal drum is a thin, tense, membrane. Into an abnormal drum a sharp knife sinks quite readily. It is incisions into such that bring amelioration of symptoms.

Antrotomy.—It has been written that in these severe cases opening and draining of the mastoid antrum is all that is required. This procedure in some few instances has sufficed. There have been instances where autopsy showed that antrotomy had failed to drain an important pocket of pus. The mastoid process of a newborn infant is frequently almost non-existent. In some cases, however, there is considerable pneumatization downward; in many there is pneumatization of the zygomatic process and in some there are extensive cells in the squamous portion of the temporal zone.

Therefore, thorough mastoidectomy should be performed in every instance. In many of our cases this operation was done under local anæsthesia with very little disturbance to the patient.

Etiology.—The Eustachian tube of the infant is much shorter and more horizontal than that of the adult and its lumen is no narrower. It

is, therefore, easy for infection in the post-nasal space to find its way to the middle ear.

DISCUSSION

The ages at which these patients were admitted were from 5 hours to 18 months. With one exception the cases were all under 7 months. Two cases were premature babies and were operated on for mastoiditis at 4 weeks of age. The change in the clinical condition of the patient came within a few days of operation.

There were a number of instances in which the infection was not bilateral. In two cases one of the mastoids opened was found to be normal. This is of significance because it might be argued that with otitis media of any degree there must be some degree of mastoiditis, and in a tiny baby mastoiditis might invariably occur in these states of great dehydration and toxæmia. It must also be commented upon that the middle ear of each of these mastoids must have presented sufficiently uncertain appearance to justify the operator in opening the mastoid.

There were cases in which only one mastoid was opened and the opening of the mastoid is credited with the recovery of the child. It can be presumed, therefore, that the unopened mastoid was not involved.

Suppurative otitis media and great debility.—Infants with discharging ears may die from their debility and yet have normal mastoids. There were four such during the period of our study. This hospital, therefore, does not believe that the mastoid of every child who has a debilitating intestinal illness should be opened.

CONCLUSION

This paper is presented to refresh and realert the profession that there is the so-called "hidden mastoid" in young infants which causes nutritional disturbances, characterized by vomiting, diarrhœa, dehydration and toxæmia. Secondly, that the diagnosis of this condition is not clear-cut, but is arrived at by consultation of pædiatrician and otologist. Mastoidectomy in suitable cases results in striking and dramatic improvement.

Exploratory mastoidectomy should not be performed in the absence of symptoms and signs of otitis media. The surgeon should operate only when he believes hidden mastoiditis a possibility.

CASE 1

Age 5 months, weight 11 lb., birth weight 4 lb. 13 oz. Diarrhœa and vomiting for 1 day. On admission had nasopharyngitis, otitis media and secondary anæmia. Temperature was elevated and she was in a toxic state. Required intravenous and transfusion. Treated with penicillin, trulfa, streptomycin and later aureomycin with no improvement. Mastoid operation performed 2½ weeks after admission with gradual improvement from that time. Lost toxicity. Discharged on feeding, with normal stools and gaining weight.

CASE 2

Age 12 days, weight 5 lb., birth weight 6 lb. 8 oz. Losing weight and taking feedings poorly since birth. Cæsarean section. Went progressively downhill, sent from Guelph to H.S.C. In spite of intravenous therapy, penicillin, aureomycin and lactic acid milk feeding the child continued downhill to 3 lb. 8 oz. This was associated with vomiting, loose stools and refusal of food, dehydration and extreme toxicity. Physical examination suggested slightly blurred markings of drum and a mastoid operation was done. Two and a half weeks after admission, vomiting stopped, stools became normal, toxæmia stopped, gained weight and child was discharged from hospital weighing 6 lb. 2 oz., 4 weeks later.

CASE 3

Age 5 months, weight 11 lb. 2 oz. Vomiting, fever and diarrhœa for 3 days. Baby had erythroblastosis fetalis at birth and was treated in hospital. Later returned on two occasions with nasopharyngitis and otitis media. Three days after last discharge became feverish, began to vomit and have diarrhœa; brought to hospital in toxic condition. Child was toxic and dehydrated, throat was red and ears not bulging but had lost normal landmarks. Treated with intravenous sulfadiazine and penicillin. Temperature was 101 to 104°. The diarrhœa continued. The ears were opened and pus obtained 5 days after admission. Because of no improvement, 2 weeks after admission simple bilateral mastoidectomy was done. The child began to gradually improve. The weight which had dropped to 9 lb. 10 oz. gradually rose to 11 lb. 8 oz., and the child was discharged 2 months after admission.

CASE 4

Age 3 months, admitted, May 4; died, May 27. This child had been in hospital from April 2 with nasopharyngitis, otitis media and bronchopneumonia. Two days after discharge was vomiting and having loose, watery stools. On admission was dehydrated, toxic and had nasopharyngitis and otitis media. He received intravenous transfusion, trulfa, penicillin, streptomycin and unilateral mastoidectomy. Despite this and supportive treatment the child died three weeks after admission. The mastoid had not healed. The other mastoid was not involved.

CASE 5

Admitted, March 28, 1949, discharged, July 1, 1949. This child was admitted with severe cœliac disease. The ears were found to be somewhat abnormal. Because of the lack of improvement on the usual good cœliac care, the mastoids were explored. The left mastoid showed a chronic mastoiditis. Following this the child improved and was discharged from hospital two months later weighing 6 lb. more than his weight at the time of the operation.

CASE 6

Age, 6½ months, admitted October 1, 1948, discharged October 30, 1948. Slow gain in weight since birth. Head cold for 6 months, refusal of feedings, 4 days. On admission it was felt that clinically this was a case of cystic fibrosis of the pancreas. Patient received intravenous therapy, penicillin and streptomycin. Ears did not appear normal. Granulations were found in the left mastoid. Following this the child improved and was discharged in two weeks after the operation, weighing 1 lb. heavier than at admission.

CASE 7

Age, 4 months, admitted, January 10, 1949, discharged February 10. Vomiting and diarrhœa for two weeks. He was operated on for pyloric stenosis at two months of age. Had been well up to two weeks before admission, when he had nasopharyngitis, was very dehydrated and ears were slightly dull. Because of failure to show improvement with usual supportive, parenteral fluids and antibiotic treatment, mastoids were explored. Both mastoids were found to be infected. Following this the child became hydrated and was discharged from hospital cured.

CASE 8

Age, 22 days, admitted September 22, 1948, discharged, November 2. Diarrhœa for 12 days, refusal of feedings 2 days. Birth weight 8 lb. 14 oz. Weight on admission 8 lb. 8 oz. In spite of parenteral fluids, supportive treatment, penicillin, trulfa and many feeding changes, the child continued to lose weight and have loose stools. Both ears were opened 3 weeks after admission with distinct improvement, but the diarrhœa persisted. Bilateral mastoidectomy was done 5 weeks after admission, and showed infected mastoids. The stools became normal and the baby was discharged weighing 10 lb.

CASE 9

Age, 7 months, admitted, August 16, 1948, discharged, October 4. The baby had been having diarrhœa, some vomiting, losing weight and becoming toxic for a period of 5 weeks, following an attack of bronchopneumonia. In spite of transfusions, and intravenous therapy as well as trulfa and penicillin, the baby continued to be toxic, have loose stools and lose weight. Examination showed the left ear to have abnormal landmarks. It was opened and some serous pus was obtained, and the mastoids were operated on 2 days later. The mastoids showed acute suppurative mastoiditis. The temperature which had been around 102° subsided, the stools became normal, parenteral fluids were discontinued. Ten days later the child was discharged, 1 lb. heavier than on admission.

CASE 10

Age, 3 months, admitted, September 3, 1946, discharged, September 27. This baby was admitted to the hospital for convulsions at 6 weeks of age. Nothing definite was found and she was discharged in one week. Shortly after discharge the stools became loose and in spite of changes of formula the diarrhœa continued, there was some vomiting and the child became dehydrated. She was re-admitted after one week. In hospital with transfusions, intravenous therapy and sulfadiazine, the temperature came down, the vomiting stopped and the stools became normal. She was discharged after two weeks. At home the diarrhœa recurred very shortly. The ears were observed to be somewhat inflamed, but it was not considered bad enough to open them. Two weeks after discharge from hospital the baby was re-admitted in a state of dehydration and toxæmia. It was treated with transfusion, intravenous therapy, hypodermoclysis and sulfadiazine. Both ears were opened. In spite of this there was no improvement and she seemed *in extremis*. Bilateral mastoidectomy was done under local anæsthesia and the mastoids were found to contain pus and debris. The stools became normal in one week, and the child was discharged weighing 1 lb. heavier than on admission and has done well since.

CASE 11

Age, 5 months, weight 5 lb., admitted, February 15, 1950, discharged, May 6. The baby was treated in an incubator bed, having been born at home by precipitated labour with no medical attendant present. It was sent in to the hospital. On admission the temperature was 96° F. There was some problem in maintaining the temperature. The weight was maintained for 2 weeks, then began to fall, the stools became frequent and loose, dehydration set in and hypodermoclysis and intravenous therapy and transfusions were necessary. In spite of this and the use of streptomycin and penicillin the toxæmia continued. Examination of the ears revealed slightly inflamed eardrums. Because the baby's condition was deteriorating rapidly, it was decided to explore both mastoids. At this time the weight was 4½ lbs. Bilateral mastoiditis was found. Following this the baby gained weight and made excellent progress weighing 6 lb. 4 oz., 2½ weeks after the operation. At this time it aspirated a feeding and developed a bronchopneumonia from which it recovered and was discharged May 6, weighing 6½ lb.

CASE 12

Age, 3 months, admitted, May 20, 1949, died, May 30. The child was admitted at 3 weeks of age for pyloric stenosis which was operated on and cured. Later admitted for aspiration of feeding at 2½ months. Shortly after discharge from hospital he began to vomit and had diarrhœa. On admission child had nasopharyngitis and otitis media and was toxic. Drainage of ears produced no cessation of diarrhœa and vomiting. Mastoidectomy was done and both mastoids contained pus. Two days later, after seeming to improve, the child was found with marked respiratory distress and fine râles throughout the lung fields. He died shortly afterwards.

CASE 13

Age, 5½ months, admitted, March 20, 1950, discharged, May 10. This child was in hospital on two previous occasions for the same problem as on this admission, namely loose stools, refusal of feedings, low grade fever, cough, loss of weight and irritability. On the two previous occasions, after a stay in hospital of approximately two weeks, the baby was discharged apparently convalescing and would only be home a few days when the symptoms all recurred. On this admission it weighed 8½ lb. which was the same weight as the birth weight. It was decided to look at the mastoids because of the recurrence of the feeding disturbance. Both eardrums were slightly abnormal. At operation both mastoids were quite involved, showing pus and much breakdown of bone. Following this, the child slowly improved and the weight gradually went up to 10 lb. On the first admission investigation had revealed that the glucose tolerance and vitamin A absorption tests were quite flat, but the pancreatic enzymes were normal. This would indicate that we were also dealing with a cœliac tendency here, possibly as a result of the chronic upper respiratory infection.

CASE 14

Age, 4 months, admitted, January 30, 1950, discharged, May 21. This baby was admitted on two previous occasions—at 20 hours for a fractured femur and hare lip and cleft palate; and at 1 month for feeding regulation as a result of the hare lip.

On the present admission the baby weighed 12 lb. It was admitted because of failure to gain and difficulty in feeding. She continued to be difficult to feed and lost weight. One month after admission she weighed 10½ lb. At this point the ears were noted to be somewhat abnormal but not bulging. They were opened. Penicillin and streptomycin had been started prior to this because of a low grade fever. The ears had a slight discharge one week later and a right mastoid was done, and a subsiding mastoid (acute) was found. Three weeks later the left mastoid was explored and a definite breakdown of the mastoid cells was found. Following this the baby began to eat better, the low grade temperature subsided, she gained weight and was transferred to the Surgical Service for plastic operation of the hare lip, weighing 12½ lb., on May 5. It stood the plastic surgery well and was finally discharged.

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REFLEX DYSTROPHY IN THE UPPER EXTREMITY*

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SYMPATHETIC dystrophy in the upper extremity is a disturbance of the neurovascular mechanism caused by various etiological factors, characterized clinically by pain and limitation of movement in the shoulder and a swollen, discoloured hand, which may go on to thickening and atrophy.

A great deal of literature has accumulated on this subject,[1 to 9] and yet to the ordinary practitioner, the condition remains extremely vague. This would seem to be due to our ignorance of the reactions of the sympathetic nervous system; also to the variegated symptomatology and physical signs.

When the fully developed picture is not presented to us, we lack certain things that aid the diagnosis, namely, a high degree of suspicion of the condition, any laboratory test which might aid us, and any therapeutic test which is readily available. It has been estimated that 30% of the abnormalities seen by a physician in his office are not noted, chiefly because they are not able to be categorized under some familiar medical name or syndrome.[10] One wonders what proportion of these are due to disturbances of the sympathetic nervous system.

Most of us are familiar with overactivity of the sympathetic system as a whole, and its manifestations have been described under such titles as tension state and anxiety neurosis. We recognize these people as being of a certain type, but we also note that almost any individual who is subjected to sufficient stress or strain may manifest symptoms. We know that trigger mechanisms, whether of emotional or organic basis may initiate the train of symptoms. We recognize that these symptoms may manifest themselves, either by heredity or conditioning, in some of the great systems of the body such as the respiratory, the cardiovascular, the gastro-intestinal, the urinary, the skeletal, the skin, or any combination of these.

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Let us now approach local derangement of the sympathetic system in the upper extremity and see what symptoms and signs might be present, what trigger mechanisms might be involved, and consider our therapeutic approach.

Symptomatology

Pain.—The onset of pain may be gradual or may occur with explosive suddenness. It may take weeks to reach the fully developed picture. Although shoulder pain usually precedes pain in the hand, the reverse may do so. It may come on coincidentally with visceral disease, or occur weeks or maybe months later, during the period of convalescence. The pain may at first be localized to the area of trauma as in Sudeck's atrophy, later spreading to involve the entire limb.

Although pain is usually the presenting symptom, it may be almost absent or it may be mild, moderately severe or of an excruciating nature. It may be mild enough that a patient in an oxygen tent with myocardial infarction may not complain of pain in his shoulder until he has more freedom of movement, at which time he may suddenly discover that his shoulder rather suddenly is aching in character, worse at night and aggravated by active and passive motion. In the hand it is frequently stiffness rather than pain, and pain as such is complained of on movement of joints. However, it may be of a burning character and in the causalgic states, as in Sudeck's atrophy, is of such severity and is punctuated by such paroxysmal aggravations that the patient may fear the approach of anyone toward the affected limb.

Shoulder.—The clinical picture in the shoulder usually presents itself as stiffness and restriction of abduction and external rotation, both on active and passive movement. There is often a diffuse tenderness about the shoulder joint, and frequently there are tender areas over the deltoid and anterior border of the trapezius. The muscles about the joint are hypertonic in an effort to splint the joint. This condition may resolve entirely in a matter of days or months, or may progress to a "frozen" shoulder, with marked atrophy of the muscles of the shoulder girdle and osteoporosis of the humeral head.

Hand.—Changes in the hand may precede or follow the shoulder symptoms, or both may be affected simultaneously. However, changes in the hand may occur independently of any dis-

ability in the shoulder, and may be so minor as to be overlooked. As a rule, the first symptom in the hand is stiffness followed by swelling, which is diffuse in type, ironing out the wrinkles, particularly on the dorsum, where usually there is no pitting on pressure. The skin is shiny and taut. The hand is held in a semi-flexed position, and active movements of flexion and extension are both limited by pain. However, if the finger is grasped, passive movement of independent joints can be carried out through a limited range. The colour of the affected hand is a dusky pink or red at first, but later the swollen tissues become pale, or even cyanotic. In the acute stage the cutaneous temperature is frequently elevated.

These changes may rapidly subside, or in the cases with progression, as the swelling decreases the skin becomes pale, and atrophy of the subcutaneous tissues and intrinsic muscles becomes apparent. Early signs of thickening of the palmar fascia may make their appearance. Thickened pads may occur on the dorsum of the interphalangeal joints.

Laboratory and x-ray findings.—The ordinary laboratory tests show no significant changes. However, de Takats has shown by plethysmographic studies that there is an increased volume of blood in the limb in Sudeck's atrophy.[11, 12] At first there are no x-ray changes. Later on, osteoporosis develops, and first makes its appearance at the metaphysis. However, the entire bone later takes on a "ground glass" appearance which is indistinguishable from the atrophy of disuse, but de Takats insists it is due to changes resulting from vasodilation. It takes 4 to 8 weeks to develop.

Etiology

In considering the etiology, one must first think of the type of individual with whom we are dealing. These people all seem to have general sympathetic overactivity. To this are added various trigger mechanisms which may be peripheral or central. In some cases the trigger mechanism is not evident, and these cases are designated as idiopathic.

Local disease of the extremity may be extremely varied, and mentioned in the literature are such things as dogbite, minor burns, felon, fractures, periarteritis nodosa, panniculitis, injury to nerve, glomus tumour, etc. Other peripheral lesions include cervical osteoarthritis, myocardial infarction and diseases of the lungs. Diseases of the higher centres may be represented by such things as cortical trauma, cerebral tumour and cerebrovascular accident. Steinbrocker[1] uses the following classification:

A. Idiopathic.

B. Peripheral lesions: (1) trauma and suppuration of the extremity (Sudeck's atrophy); (2) vascular disease (thrombophlebitis, periarteritis nodosa); (3) osteoarthritis of cervical spine; (4) cardiac disease — post-infarctional (5) other thoracic diseases (pneumonia, etc.); (6) nodular panniculitis (Weber-Christian).

C. Lesions of cord and ganglia: (1) herpes zoster; (2) diffuse vasculitis?

D. Higher lesions: cerebral lesions (hemiplegia).

The various etiological factors in 18 recent admissions to Shaughnessy Hospital were as follows: cervical osteoarthritis 8; myocardial infarction 3; bronchogenic carcinoma 1; lobar pneumonia 1; congestive failure 1; hemiplegia 1; post-traumatic 1; idiopathic 2. It will be noted that cervical osteoarthritis is listed as the etiological factor in a high percentage of cases in this small series. All of these fall into the age group in which cervical osteoarthritis might be expected, and it is conceivable that some might be classified as "idiopathic".

Mechanism.—In trying to explain how dystrophies can occur from such widely differing etiological factors, we are limited by our knowledge of neurophysiology. Steinbrocker[1] feels that the mechanism common to all forms of reflex dystrophy, regardless of etiology, involves the concept of a "vicious circle" mediated through an internuncial pool of active stimuli in the cord, provoked and maintained by the primary precipitating agent.[13, 14] It is interesting to speculate as to what the trigger mechanism may be in idiopathic cases. All the individuals we have seen have been tense and showed manifestations of tension state, regardless of their etiological factor.

One of our cases was a young soldier, aged 22, who in January, 1949, returned to Ontario on leave after 2 years in the Yukon. Shortly after his arrival he met a girl in a beer parlour with whom he associated for 3 to 4 weeks. He then returned to the Yukon. Two months later he received a letter from his girl-friend stating that she was pregnant. He obtained compassionate leave and married the girl. However, his family was averse to his plans and rejected him and his future wife. A few days later he was transferred to British Columbia. Two months later his wife arrived. Married life was satisfactory for one week. He found that she was not pregnant although he never discussed this with her.

On August 16, 1949, she took his cheque and left for Ontario with only a short explanatory note. On August 17, he reported on sick parade with a swollen right hand, slightly painful, especially on flexion of the fingers. This gradually cleared and disappeared about the middle of September, but was followed shortly after by similar symptoms in the left hand. He was admitted to Shaughnessy Hospital on October 21. Examination on admission showed the skin of the left hand to be mottled,

Fig. 1.—Thickening of palmar fascia following myocardial infarction.

colour cyanotic; hand and fingers diffusely swollen; skin warm and moist. About the nailbeds the skin was shiny and atrophic. No change in skin colour occurred on elevation or dependency. Similar changes were present in the right hand, but to a lesser degree. Treatment consisted of stellate blocks, priscol and physiotherapy, with slight temporary improvement.

He was referred to the Psychiatric Department in December, 1949. They found him to be an intelligent but emotionally immature man, with rather a rigid code of life. In their conclusions they state: "We consider this a case of conversion hysteria with trophic changes which responded very promptly to simple psychotherapy during the last 3 interviews". It must be noted that this marked improvement coincided with his arrival at some definite conclusion as to further management of his marital situation.

It would seem that the etiological factor in this case was emotional tension being built up in the sympathetic nervous system and spilling over into the upper extremities, where a vicious circle was initiated which resulted in dystrophic changes in the hand, even to minor thickening of the palmar fascia.

THERAPY

Removal of the initiating or trigger mechanism would seem to be a rational therapeutic measure. This is possible in certain cases where the etiological factor is of peripheral origin, such as glomus tumour or suppuration in the arm, but presents a slightly more complex problem if the etiological factor is a myocardial infarct. Our next approach should be towards interrupting at some point the vicious circle of the reflex. For the upper extremity, repeated injections of the stellate ganglion give temporary relief, which may be permanent. Somewhat similar results are obtainable by certain drugs such as priscoline (2-benzyl-4, 5 imidazoline HCl), and dilvasene (dimethylamino-1-methylene-dioxy-2, 3 propane iodomethylate). These are more effective in the earlier stages. Later in the disease, when the hand is blue and cold, sympathectomy may be of value.

Treatment of the patient is important. All of these patients are tense. General measures as for tension state or anxiety neurosis should be carried out, and this should be accompanied by a program of intensive physiotherapy, including active and passive movement of involved joints several times daily, under supervision.

SUMMARY

1. The various etiological factors which produce reflex sympathetic dystrophy in the upper extremity are discussed, and the rôle of tension and anxiety states in this condition is emphasized.

2. The clinical, laboratory and radiological manifestations and the practical management of these patients are briefly outlined.

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ACUTE GENERAL ŒDEMA OF THE BRAIN IN CHILDREN WITH HEAD INJURIES.—Following head injury, children may show the symptoms and signs of middle meningeal hæmorrhage which clear so rapidly that the diagnosis is a doubtful one. Two such cases, which were severe and were operated upon, demonstrated the presence of acute œdema of the brain and the same diagnosis was postulated in 8 other cases in which operation was withheld. All patients recovered completely despite the temporary alarming picture of medullary compression believed due to the generalized cerebral œdema.—Pickles, W., *New England J. Med.*, **242**: 607, 1950.

THE PRESENT STATUS OF ENDOCRINE THERAPY IN THE TREATMENT OF CARCINOMA OF THE BREAST*

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AT the outset it is important to emphasize that endocrine therapy is *not* an alternative to long accepted standards of treatment for the comparatively early case of carcinoma of the breast. Where the primary site exists alone or where there has been extension to the regional lymph nodes, adequate surgery with or without radiation is still not only the treatment of choice but the only treatment that should be offered to the patient. There has been a tendency in the current medical literature to suggest that, for the so-called "poor risk" patient (because of co-existing cardiac or other systemic conditions), endocrine therapy may be used as an alternative to adequate surgery; or else that the surgery might be something short of complete with subsequent supplementation by endocrine therapy. The treatment of cancer of the breast is still, and likely to remain for many years, an adequately performed surgical procedure as taught by Halsted. This means removal of the whole breast with no sparing of the overlying skin, removal of both pectoral muscles along with a meticulous dissection of the axilla to excise all lymph nodes and lymph bearing tissues irrespective of whether these are visibly or palpably affected or not.

It is only in the case of metastatic growths outside of these areas—or recurrences within these areas—that the use of endocrines can be considered. The impetus to hormone treatment in metastatic carcinoma of the breast was given by the brilliant work of Huggins and Clarke[1] who laid the foundation for the œstrogen treatment of cancer of the prostate. There is an obvious analogy in two such hormonally sensitive glands as the prostate and the breast; and it was immediately suggested that, if the administration of œstrogens was of value in the control of secondaries in the predominantly "masculine" environment of carcinoma of the prostate, the trial of androgens was justifiable for the control of metastases in carcinoma of the female breast.

Furthermore, experimental study by Reynaud[2] and by Heiman[3] encouraged this view. By injecting testosterone to cancer-prone strains of mice, Heiman was able to reduce the occurrence of breast cancers from the expected incidence of 54% to an observed incidence of 16%. Since then there has been a wealth of carefully documented observations on the use of both androgens and œstrogens on the metastases of breast cancers so that certain conclusions can now be reasonably drawn.

It is the intent in this paper to complete a report on one patient previously recorded by the author[4] and add two further case summaries and then to sift out certain conclusions from these and from a review of the prevailing literature.

CASE 1

M.W., aged 40. When first seen in October, 1946, there was a large carcinoma of the right breast with very many discrete secondaries in both lungs. Palliative amputation of the breast to prevent the certainty of fungation was performed in November, 1946; injections of testosterone propionate (perandren) were started a month prior to surgery. In three months a remarkable and almost complete disappearance of the secondaries was apparent in a repeat x-ray film. In this time she had gained weight, pain in the chest disappeared along with the cough and bloody sputum previously noted, and she was able to return to her employment as a secretary.

She remained thus for the ensuing 12 months and was maintained on testosterone therapy. However, in spite of the continuing sense of well being and without any obvious clinical manifestations, monthly x-ray films showed gradual recurrence of the pulmonary secondaries and also a rapidly extending osteolytic lesion affecting the frontal and parietal bones of the skull. She finally broke down in health and gave up work 20 months after the start of treatment and died 5 months later.

Post mortem investigation revealed extensive metastases in both lungs, a large osteolytic lesion of the vertex of the skull with pressure on the cerebral cortex. Curiously enough there was gross lymph node involvement, not on the side of the previous mastectomy but on the opposite side where the breast was quite unaffected. Dr. D. W. Penner's report on the microscopic sections was "adenocarcinoma grade two".

In short, this patient remained at her occupation for 20 months with a sense of well being, in spite of obvious gradual extension of widespread metastases (after an initial but temporary regression of pulmonary metastases). It is noteworthy, too, that extension to cranial bones occurred while the patient was on continuing testosterone therapy.

CASE 2

Mrs. J.J., aged 72. This patient was first seen when admitted to hospital for treatment of pain from extensive bony metastases in her spinal column. She was entirely bed-ridden, incontinent, and required from 6 to 8 injections of ¼ grain of morphine daily. The responsible breast cancer was hard, fixed and obviously inoperable. She was placed on injections of testosterone propionate and gradually within the next three weeks she asked for fewer morphine injections and stated that she was free of pain. She regained bladder control and was able to get into a wheel chair. She stated that she felt she could walk, but this was not allowed because of the fear of pathological fracture of her spine, which was honeycombed with cancerous deposits. It now became possible to transfer her from an active hospital bed to a nursing home. In the nursing home injections of testosterone were stopped and she gradually became worse

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and died in four months. Whether or not this patient's life might have been prolonged in comparative comfort had the injections been continued is purely conjectural, but there is no doubt that there was an improvement in her comfort for the short time that treatment with androgens was carried out.

CASE 3

Mrs. G.R., aged 55. This patient's history began in 1933 (age 38) when she had a Halsted operation. Pulmonary metastases were first noted 12 years later in 1945. In January of 1947 injections of testosterone propionate were started and continued for 9 months. Aside from some persistent shortness of breath (not surprising in view of the almost complete obliteration of her lung fields by the massive deposits), she regained her sense of well being and returned to her occupation as a practical nurse. There was, however, no evidence radiographically that the size or number of the pulmonary metastases was affected by the treatment. Treatment by testosterone was discontinued in September, 1948, when she moved to the west coast. The latest report on her condition from Dr. Wm. McElmoyle of Victoria, B.C., dated January, 1950, states that she has again become progressively worse with the development of ascites undoubtedly due to abdominal spread.

DISCUSSION

The problem of assessing any course of treatment for cancer is closely bound to the difficulty of assessing the rate of growth of any tumour in the human body. The word "human" is used advisedly; animal experimentation has given us fairly accurate curves of growth of animal tumours so that one can predict probable duration to a reasonably accurate degree. In humans, however, so many variables affect the rate of growth that accurate prediction in any specific case becomes extremely difficult if not altogether impossible. For this reason pieces of evidence that have the merit of objectivity are useful.

"Improvement" in a patient's condition may be roughly measured in one of two ways (the first being, of course, of much greater value). (1) Objective evidence of regression of growth: (*a*) by x-ray appearances from time to time as in lung or bone; (*b*) by actual measurement of palpable growths. (2) Evidence of improvement in patient's state of well being as by (*a*) return to former employment; (*b*) reduction of pure pain-relieving drugs; (*c*) the ability of a previously bed-ridden patient to be up and about, at least to the extent of looking after her own elementary functions.

In Case 1 there is objective evidence of temporary disappearance of pulmonary metastases along with temporary improvement in clinical state coincidental with administration of testosterone propionate. It can reasonably be assumed that in this particular patient the testosterone exerted a restraining influence on the natural course of cancer spread. No such clear-cut evidence is available in Case 2 but the disappearance of pain during an interval of treatment with testosterone is worthy of record. In Case 3 the patient had lived an unusually long time with apparent temporary arrest of large metastatic deposits in the lungs, even prior to the administration of testosterone. It is not possible to state just what influence testosterone had on the actual rate of growth, although there is little doubt that the patient felt better while under treatment with androgens and was able to return to her work.

It may be of value to summarize these and other observations on the use of androgens and œstrogens in breast cancer.

Age of patient and dosage.—Although some writers state that in the post-menopause group œstrogens are more effective than androgens, all are agreed that œstrogens are definitely not indicated in the younger age group and may actually hasten the rate of growth of the metastases. Because "age", in this instance, is related to "hormonal state" and because "hormonal state" may be extremely difficult to assess, it seems preferable to avoid the use of œstrogens entirely. There is no such contraindication to the use of androgens on the basis of age. There is, however, a distinct masculinizing effect which occurs with the use of testosterone and becomes rather obvious in dark haired women. This in a lethal disease is not a valid contraindication. Indeed, there is reason to believe that dosage of androgens should be rapidly increased until a distinct masculinizing effect is observed. Since there is no known toxicity to high dosage, the aim should be to obtain hirsutism and increase of weight within a trial period of one month, injecting about 3,000 mgm. in this 30-day period. If the hirsutism and weight increase is not achieved in this preliminary course, an implantation of 3,000 mgm. should be performed and another course of 3,000 mgm. be administered in one month by injection. When, however, a definite masculinizing effect is achieved, the injections can be discontinued and maintenance treatment can consist of an implant of 3,000 mgm. every three months. Oral treatment is not so effective as either the injection or the implant. A possible explanation for this will be mentioned later.

Effect on metastases.—Favourable effects have been observed on osseous, visceral and cutaneous metastases. In that group of cases showing a

response, x-rays have indicated restoration of bone structure (Adair[5]) and reduction or retardation of growth in pulmonary metastases (Klass[4]), while in other favourable instances cutaneous and soft tissue masses have become reduced in size. Instances have been recorded of malignant cutaneous ulcers healing, of the cessation of blood-stained pleural exudates and of the recovery of motor spinal nerves from pressure (Cade[6]).

Metabolic changes. — These are observations carried out by Prof. N. F. Maclagan and reported by Cade[6] (see Fig. 1). (1) Blood calcium. Contrary to other observers Maclagan found no evidence of appreciable hypercalcæmia with intensive androgen therapy. The danger

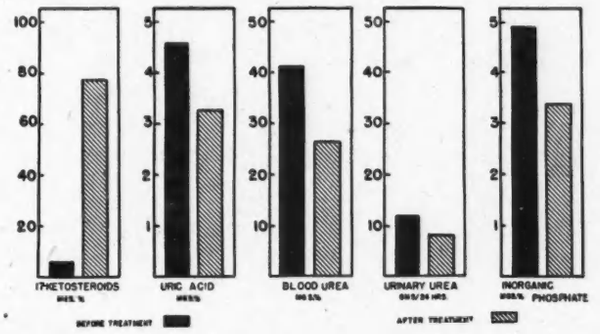

Fig. 1.—Biochemical changes observed following intensive treatment by testosterone (after Maclagan reported by Cade[6]).

of kidney failure from this cause seems to be exaggerated. (2) Alkaline phosphatase, urinary creatinine and basal metabolic rate all showed no significant change. (3) There was a reduction in inorganic phosphate, blood uric acid, blood urea and urinary urea. (4) Urinary 17-ketosteroids are markedly increased. It is noteworthy that this increased excretion drops markedly within a day or two after injections are stopped. It may also be a point of some significance that treatment by the oral compounds of testosterone does not cause a rise in the excretion of 17-ketosteroids. This has led most observers to prefer the use of injectable compounds, although it cannot be definitely stated from this observation that oral compounds are entirely without value.

CONCLUSIONS

1. There is no valid evidence that the administration of testosterone in advanced malignant breast disease has any harmful effect either by intrinsic toxicity or by any adverse metabolic effect.

2. There is acceptable objective evidence that testosterone in adequate dosage improves the nitrogen balance of the patient suffering from metastases from a cancer of the breast, improves her sense of well being, eases pain, prolongs her period of independency and may possibly prolong life.

3. There is no evidence that testosterone has any specific effect whatsoever on the tumour cells themselves. The total improvement of the patient is probably due to a number of factors vaguely grouped together in the phrase "increasing the resistance of the host". Until the nature of such "resistance" is better understood, the exact mode of action of testosterone in this disease will probably remain enigmatic.

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CHOLECYSTITIS AND CHOLELITHIASIS*

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A SURVEY of my own operative cases of biliary tract disease, covering the period from 1937 to April 1949, brought out certain facts that have been grouped together in Table I and the subsequent tables.

It is well known that biliary tract disease is commonly manifested typically by symptoms which fall into three clinical groups, or combinations of these. Pain heads the list, being characteristic in "biliary colic" and some instances of "acute cholecystitis", and at other times it is atypical. It was a prominent symptom in approximately 85% of the cases of this survey. This high figure can be related readily to the large group of acute cases treated. Jaundice was a common complaint, as listed above. Subclinical jaundice, as demonstrated by laboratory tests, occurred in a larger group. Indigestion was recorded as a notable symptom in 147 cases, being atypical in nearly half of these. A large proportion of the cases pre-

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TABLE I.

ANALYSIS OF 429 BILIARY TRACT OPERATIONS IN 396 PATIENTS

Age range: 16 to 85 Sex ratio; male: female—53:343

Jaundice (present or recent)	85	(21.5%)
Pancreatic disease of special note	43	
Significant liver disease	14	
Gallbladder neoplasms	5	
Gallbladders containing stones	333	
Gallbladders without stones	38	
Common duct calculi	45	

sented good clinical indications for operation in addition to positive roentgenological findings (non-visualization, impaired function, positive or negative shadows under various conditions), and supportive laboratory data were commonly noted. Cases of doubt were rechecked.

Pancreatic cases are included in the statistical analysis only because of the close correlation of disease in this organ with gallstones and cholecystitis. A gallbladder packed with calculi and obviously inflamed, associated with a large, firm pancreas, but a negative biopsy, helped to mask the underlying carcinoma of the head for many months. Conversely, a similar finding, but inflammatory in nature, led to a palliative drainage operation (Y-type of cholecyst-jejunostomy) which proved remarkably successful, if somewhat unorthodox, treatment. In one case another surgeon had done a cholecystectomy some months before the man came into my hands with an unmistakable malignancy in the head of the pancreas; in another it would have been easy for me to make the same mistake. Such confusion, and the presence of gallstones and gallbladder disease in the vast majority of pancreatic problems that confront the surgeon, seem to call for watchfulness on the part of those handling biliary tract problems.

TABLE II.

NOTABLE EXAMPLES OF PANCREATIC AND HEPATIC DISEASE FOUND IN THE SURVEY OF THE BILIARY TRACT CASES

Pancreatic lesions	*No.*	*Deaths*
Carcinoma of head	12	4
Acute pancreatic necrosis	6	2
Chronic, or recurrent, pancreatitis	24	1
Multilocular cyst (drained once before)	1	0
Hepatic disorders		
Acute hepatitis	1	0
Biliary cirrhosis	11	0
Portal cirrhosis	2	0

The cases of significant disorders of the pancreas and liver have been broken down in Table II, and the mortality has been indicated for each group in which deaths occurred. The fatalities are summarized more fully in a later Table.

Only operative cases have been included in this listing. Pancreatic problems will not be considered at all fully in this paper, but it may be noted in passing that several resections have been done (both 2-stage and 1-stage methods and different techniques) and the results have seemed to be worthwhile, although death from recurrent or metastatic malignancy is grievously common towards the end of the first year. Hospital deaths in this group have supervened only where resection has proved impossible and palliative operations have been done. Operation has been avoided in the presence of acute pancreatic necrosis except under special circumstances or where an accurate preoperative diagnosis has not been made. In the event of exploration, handling of the necrotic tissues has been shunned and an attempt has been made to provide biliary drainage by the simplest effective procedure. Several methods have been followed. It is very doubtful, to my mind, whether any operative intervention can accomplish anything helpful for these cases at the acute stage of the pathological process, and any additional operative trauma may easily turn the tide the wrong way.

Under the heading "Chronic, or recurrent, pancreatitis" are included only those with definite changes in the organ, viewed in the light of the clinical history, laboratory study, the operative findings, and biopsy in some cases. The size and physical characteristics of the gland have received particular attention. The previously drained pancreatic cyst was large, multilocular, and matted firmly to the surrounding structures. Complete removal could not be accomplished safely. The loculi were drained as thoroughly as possible and the stone-containing gallbladder was dealt with. She remained reasonably comfortable for 6 years, until her death from a uterine carcinoma.

In two of the instances of liver disease operation was frankly exploratory in nature (one in each type of cirrhosis), in all the others the

preoperative diagnosis was cholecystitis. Gallstones were found in approximately half of this small group. Liver biopsy was carried out in a larger series. It is my feeling that this can be done readily at operation without added risk and that it should be a more common practice wherever the condition of the liver raises the least doubt.

The principal abnormalities of the gallbladder encountered in the series are summarized in Table III.

TABLE III.

PATHOLOGICAL CONDITIONS OF THE GALLBLADDER IN THE SERIES

Anomalies—Congenital absence	1
Double gallbladder and cystic duct	1
Calcified gallbladder	1
Primary neoplasms—Papillomas	2
Carcinomas	3
Calculi present	333
Non-calculous gallbladder	38
Acute or subacute (subsiding acute) cholecystitis	123
Chronic cholecystitis	239
Cholecysto-duodenal fistula	5

No attempt has been made to enumerate the different variations in the arrangement of the biliary ducts or of the cystic vessels. This important subject has been stressed in recent years by the American College of Surgeons film, produced by Warren Cole and associates, and detailed descriptions appear in the literature from time to time (*e.g.*, that of Daseler, Anson, Hambley and Reimann[1]). In one case no suggestion of a gallbladder could be found on thorough exploration or repeated cholangiography as in the cases reported by Latimer *et al.*[2] The common bile duct was loaded with calculi. In some way the T-tube inserted into this duct came out too early; reoperation was done eighteen months later for a return of obstructive jaundice, more stones were removed and drainage was continued for over a year. There has been no further trouble in a period of over eight years.

In a man of 46, with an atypical clinical picture of upper abdominal distress, a completely calcified gallbladder was found and removed. There were no stones. Both women with papillomas of the gallbladder were reported to be examples of cholesterolosis with calculi. The three carcinomas of the gallbladder occurred in female patients: in two the lesion was extensive, and the pathologist believed that the primary process was in the gallbladder. In the other there were two distinct cell types, reported as squamous-cell and adeno-carcinomas coexisting.

Calculi, varying greatly in regard to size and number, were found in the large majority of cases, and frequently related to complicating or associated conditions. Acute inflammation of the gallbladder did not appear apart from calculi (usually impacted in the neck, or less often in the cystic duct), and subacute changes were so recorded only twice in the series. True chronic cholecystitis was also rare in the absence of stones. Cholecysto-duodenal ulceration was noted in five cases of long-standing disease. In general, the gallbladder was removed and the gap in the duodenal wall was closed transversely with two layers of sutures. In a woman of 80 a Finney pyloroplasty was added because of the chronic changes in the wall of the duodenum. Common duct stones, closely related to duration of symptoms and to the presence of stones in the gallbladder, paralleled the mortality and morbidity more closely than did any other single factor.

The management of the various biliary tract problems was determined for each case after careful clinical assessment, with due consideration of the roentgenological and laboratory data. Special emphasis was placed on preoperative preparation in every patient who could be better fitted for the ordeal. It is obvious that disordered physiological and biochemical balances must be corrected promptly. This is particularly true of complicated cases. There are strong arguments for early recourse to corrective surgical intervention in the various biliary problems. It seems to be established that biliary disease tends to be progressive, although this advance is frequently so gradual, or the steps are so discontinuous, that the increasing gravity of the pathological state is not appreciated fully. With time, and perhaps recurrent bouts of obstruction and inflammation, there is extension of trouble to the bile ducts, the pancreas, the liver, and the surrounding viscera. Longstanding disease was responsible for most of the bad-risk problems met, with the attending mortality and morbidity.

In the present series operation has been undertaken whenever the symptoms were making life miserable, or it was felt that such was in the best interests of the individual patient. (In point of fact, most cases with any symptoms and positive findings on study, merit operation). In

most of the pathological states the indications were those generally accepted.

Acute cholecystitis has aroused much controversy, but surely its treatment can be placed on a rational basis by adherence to the fundamental principles governing all modern surgery. Preoperative care is vital; the longer the process has existed, and the more severe its intensity, the greater the importance of immediate steps to restore the normal balances of the organism. Deficiency states must be counteracted. This may be done in a matter of hours in early or mild disturbances; conversely, it may be a difficult task to accomplish in several days. The time devoted to this phase will depend on the complexity of the problem and the response of the disease to favourable treatment. Where the acute process shows signs of subsiding rapidly, it seems reasonable to postpone operation until a "free interval". Where there are evidences of necrosis of the gallbladder or peritonitis, or the condition suggests unfavourable progress, with the patient under good hospital management, then exploration must be contemplated without awaiting ideal building up. In the vast majority of acute cases "early operation" would seem the choice, after all necessary study and preparation, provided that the experience of the surgeon and the facilities available make this possible with results comparable to those obtained in good hands for elective operations of the same type. This has been the policy determining the care of the acute cases in this series, at least in essence. The results will speak for themselves. It must be made clear that operation after preparation is very different from the hasty, "immediate" operation that has at times brought discredit on the idea of early intervention in acute cholecystitis. From the voluminous literature on the aspect under discussion may be selected Heyd's[3] excellent analysis of an enormous series of cases, with arresting statistical support of the principle of early operation. He goes so far as to say that the patient permitted to go to a second attack of acute cholecystitis before cholecystectomy runs double the mortality risk of the case resected during the first bout. A very few cases of operation in, or following, the first attack have impressed me with the argument for greater aggressiveness in this direction. The patient has been spared prolonged distress and the hazards of complications of the disease, and the results have proved most gratifying.

It may be suggested here in passing that if it were possible to admit every acute cholecystitic patient to a good hospital at once, under the care of experienced medical and surgical teams, for handling along the above lines, then the dangers and distress of gallbladder problems should largely disappear.

TABLE IV.

OPERATIONS PERFORMED ON THE BILIARY TRACT IN THE SERIES

Operation	*Primary*	*Secondary*	*Total*
Cholecystectomy	336	20	356
Cholecystostomy	9	0	9
Choledochostomy	87	18	105
Miscellaneous duct operations	2	13	15
Liver biopsy	—	—	19
For pancreatic conditions	25	2	27
Other operations	—	—	9

The operation of choice, wherever feasible with safety, was cholecystectomy. Drainage procedures were used only in desperate risk cases: one such was an unbalanced diabetic, in coma, with obstructive jaundice and temperature of 105; another exceedingly obese and elderly man, with a necrotic gallbladder, had a large and irreducible umbilical hernia and presented a late picture suggesting intestinal obstruction. In the main the others were similar advanced and complicated cases of the acute type, usually with gangrene of the gallbladder or abscess formation in the area. Two women were chronic cardiac invalids, with auricular fibrillation and episodes of congestive heart failure; in both a successful cholecystectomy was carried out some months later. The only drainage procedure for chronic cholecystitis was in a woman of 85, and at the absolute insistence of the physician concerned. It was an ill-advised procedure, for removal of that gallbladder would have been simple, and she was in trouble with more stones and severe symptoms a year later. In 17 patients cholecystectomy was performed after drainage procedures done electively by other surgeons from one to thirty years earlier; one woman had been subjected to cholecystostomy four different times, and another, after three such incomplete operations, had been told, "Your gallbladder cannot be removed". There is clear evidence that the gallbladder that merits operation calls for removal; incomplete procedures are followed so regularly by recurrent trouble, further operations, and increased morbidity and mortality.

In Table V the manner of dealing with the diseased gallbladder is set out in relation to the pathological condition of the organ.

TABLE V.

OPERATIONS FOR CHOLECYSTITIS

1. ACUTE AND SUBACUTE (SUBSIDING ACUTE) CHOLECYSTITIS

Operation	*No.*	*Deaths*	
Cholecystostomy	8	1	(16.5%)
Cholecystectomy and exploration C. duct	24	1	(4.1%)
(Calculi were found in 11, 46.0%)			
Cholecystectomy alone	90	1	(1.1%)
Total	122	3	(2.4%)
(N.B. Gangrene or a localized abscess was present in 26 cases, 21.1%)			

2. CHRONIC CHOLECYSTITIS			
Cholecystostomy	1	0	
Cholecystectomy and exploration C. duct	87	1	(1.1%)
Cholecystectomy alone	151	1	(0.66%)
Total	239	2	(0.83%)

The mortality figures for the different groups are listed. The one fatality following cholecystostomy was a man who had been very sick for six weeks, with a large collection of pus about a necrotic gallbladder, and a chronic pancreatitis; his was a "hepato-renal" death. Of the two deaths following cholecystectomy for acute disease, one was age 74, with an empyema of the gallbladder and common duct stones; she refused operation until two weeks past her prime, and then slowly sank and died from "uræmia". The other, a man of 73, had been desperately ill in hospital for nearly 12 days; operative intervention was requested by his two practitioner relatives when rapid deterioration of his condition had taken place, and the clinical picture resembled a late case of perforated duodenal ulcer. His was also a "liver failure" death.

The exceptionally high incidence of serious complications already present in the acute case is shown in the table. This must be attributed to the large number of referred cases, often after unduly prolonged conservative management. Most of these did well.

There were two fatalities in the chronic cholecystitis group. One was due to surgical shock. She was a readmission and a transfer from another service; on review later, she should have received better preparation. This must be regarded as a death that should have been prevented. The other was in a man of 350 pounds weight, an adiposogenital syndrome. Life had become intolerable for him by reason of his incessant pain from an enormous load of gallstones. Many surgeons had refused to undertake the formidable and hazardous task of removing the offending viscus. This was accomplished without mishap (operating at elbow depth), but he died with gross pulmonary œdema on the third day.

Exploration of the common bile duct, generally followed by T-tube drainage, was carried out 110 times in the series; the indications generally accepted have been grouped together under Table VI, where the factors determining the duration of such drainage have been listed also for convenience. In the main, these call for no special elaboration. It would appear to be true that careful duct exploration *per se* does not increase the dangers of the operation—but the presence of ductal disease does do so.

TABLE VI.

THE INDICATIONS FOR EXPLORATION OF THE COMMON DUCT IN THIS SERIES

1. Jaundice, obstructive in type, recent or present (gross or subclinical).
2. Chills and fever suggesting suppurative cholangitis.
3. Palpable calculus.
4. Dilated or thickened duct.
5. Sediment in bile aspirated from duct lumen.
6. Non-calculous gallbladder with true biliary symptoms.
7. Selected cases with small, contracted gallbladder, or in presence of pancreatitis or hepatitis; occasionally when the gallbladder contains many small stones.

FACTORS GOVERNING THE DURATION OF DRAINAGE OF THE COMMON BILE DUCT

1. Gross and microscopic characters of bile (clean, clear, no sediment).
2. Results of prolonged clamping of the tube after meals.
3. Effects of irrigation of tube; amount and type of return.
4. Cholangiography.

It may be noted here that it is probably a wise policy to drain all common ducts that have been explored, and that the tube should not be taken out until the patency of the duct has been established. In the final analysis, roentgenological visualization during and subsequent to the injection of lipiodol seems to give the clearest demonstration of the real state of affairs. This method has not been employed during operation in the present series, but there were times when it would have seemed advantageous. It is known that the interpretation of the films may be difficult.

The various bile duct operations in this series are collected in Table VII, with the relevant mortality figures.

TABLE VII.
OPERATIONS ON THE BILE DUCTS IN 109 PATIENTS

	No.	*Deaths*	
Choledochotomy and choledochostomy			
with *primary* cholecystectomy	87	2	(2.3%)
with secondary cholecystectomy	9	0	
as a secondary procedure	14	2	(14.3%)
Repair of divided common duct	1	0	
Operations for strictures	7	2	(28.5%)
Removal of cystic stump containing calculi	2	0	
Choledochoduodenostomy	6	0	
Total duct operations	126	6	(4.7%)
All *secondary* duct operations	30	4	(13.3%)

The above facts indicate clearly the increased dangers of long-standing and persistent duct disease, requiring reoperation. The two deaths following secondary choledocholithotomy both occurred in a group of six cases of acute suppurative cholangitis, in four of which transduodenal attack was necessary in order to dislodge the solidly impacted calculus. In another case of this type, not included in this statistical survey, operation was withheld at the insistence of the physician concerned. This uncommon complication of common duct stones is so lethal that everything possible must be done to prevent it. One of the above fatalities had a forty year history of recurrent febrile bouts with pain and jaundice. How simply her biliary tract might have been cleared out years before.

The single instance of a sectioned common duct illustrated many of the undesirable aspects of biliary surgery as practised too frequently even today. The patient was a young woman of 27, with very vague complaints, without any adequate investigation, attacked by an "occasional operator" in a poorly equipped small hospital. The procedure was hasty and manifestly disregarded the cardinal principles of biliary surgery. These include the following simple and basic points: generous incision, well planned; good visualization of all structures, especially about the gallbladder neck; positive identification of all tissues before section of any; familiarity with the normal anatomical variations; gentle and careful dissection. This woman was sent along a few days later with a thin, non-calculous gallbladder, rendered completely necrotic as a consequence of operative trauma, with the common duct divided and the ends ligated, with the makings of a subphrenic abscess; she survived a difficult Allen type of repair operation and has remained well for two years since then.

The strictures encountered had followed previous operations on the common duct except in one instance, after a simple cholecystectomy. The records suggested some hæmorrhage obscuring the field during the initial operation in this case. Repeat operations were required in two patients because the tubes inserted in the duct at the earlier operation for stricture had become plugged by sediment (one was a rubber tube, the other vitallium). In two women with severe and long-standing postcholecystectomy syndromes, exploration revealed substantial stumps of the cystic duct left behind and containing calculi; one of these had gone along for 15 years like this, the symptoms having become worse latterly. It would appear from the literature that this is a not uncommon cause of trouble after cholecystectomy (Peterson;[4] Hicken, White and Coray[5]), and there is much debate concerning the mechanisms whereby pain is produced in this group (Womack and Crider[6]). The importance of a complete primary operation is attested again, and the need of sectioning the cystic duct close to the junction with the common duct.

In some cases of chronic or recurrent pancreatitis the common duct was anastomosed to the first part of the duodenum (transverse stoma, using the supraduodenal portion of the duct). The internal biliary drainage so obtained has seemed to serve these problem cases better than any other procedure; one of this small group still has infrequent attacks of the recurring type.

A number of non-calculous gallbladder cases in this series were studied further in an attempt to account for the symptoms leading up to the original investigation and exploration. The results are tabulated in Table VIII.

It is apparent that recognizable lesions can be demonstrated in a large percentage of this group on review. Most of these call for no comment. Those in whom no adequate pathological cause could be discovered are listed as functional states or motor abnormalities of the biliary system. Some of these cases had other

TABLE VIII.

FINDINGS IN 38 CASES WITH NON-CALCULOUS GALLBLADDERS

Gallbladder disease	
Subacute inflammation	2
Chronic inflammation with ulceration	1
Cholesterolosis	2
Common duct stone	1
Liver disease	
Biliary cirrhosis	6
Portal cirrhosis	1
"Healed tubercles"	1
Pancreatic disease	
Pancreatitis	3
Carcinoma of head	1
Duodenal disease	
Duodenal ulcer	2
Diverticulum	1
Hiatus hernia	1
Functional states and "dyskinesia"	16

pathological conditions that may have contributed to the symptomatology, *e.g.*, hypertension, diabetes, arthritis, uterine fibroids, etc. Detailed classification of these 16 cases did not seem possible with any degree of certainty. Many of them presented gallbladders that were thick-walled and shrunken, often containing unusually viscid, dark bile. A small number showed thin-walled, dilated, apparently toneless gallbladders. It may well be that these differences are essential and that the two groups mentioned above represent respectively the hypertonic and hypotonic types of biliary dyskinesia described by various writers (*e.g.*, Lockwood[7]). It is reasonable to suppose that early recognition of these conditions, and effective prevention of biliary stasis, may some day contribute materially to the lowering of the incidence of gallstones and of the attendant complications.

TABLE IX.

OPERATIONS PERFORMED IN COMBINATION WITH THOSE ON BILIARY TRACT

Vagotomy for associated duodenal ulcer	1
Pyloroplasty	1
Excision of duodenal diverticulum	1
Resection of carcinoma of colon (right hemicolectomy)	1
Transverse colostomy for advanced diverticulitis	1
Removal of Meckel's diverticulum	1
Appendectomy	178
Herniorrhaphies	
Hiatus hernia	3
Incisional hernia	16
Umbilical hernia (irreducible in 1)	5
Epigastric hernia	1
Inguinal hernia (recurrent)	1
Pelvic operations (hysterectomy in 2, etc.)	13
Rectal operations	3
Lipectomy	2
Total	238

A variety of abdominal operations were performed at the same time as the biliary procedures listed in this paper. These have been enumerated in Table IX.

The only death in this group was the 350 pound man to whom reference has been made in whom an incidental appendectomy was done. Operative procedures on the same patients, but not coincident with those on the biliary system, have not been considered. There can be no doubt that additional operating is not to be commended unreservedly, but the above figures do support the contention that where proper indications exist, and the circumstances and facilities are favourable, other operations may be undertaken without undue hesitation.

Table X presents a concise summary of all hospital deaths in the biliary and pancreatic cases that have been reviewed in this paper. It will be noted that pancreatic disease and the complications of gallstones, especially in the common duct, are prominent factors underlying many of the fatalities.

In Table XI are presented the basic data from the follow-up regarding the results in 100 unselected cases of the series from 1 to 12 years after cholecystectomy. Acute inflammation was recorded in 43, and a chronic process in 57; the common duct was explored in 8 of the former and 11 of the latter, 19 in all. Secondary operations were done in several cases. The criteria for classification as "good" or better include freedom from all biliary tract symptoms, no noteworthy restriction of diet, well-healed abdominal wall. The group designated "satisfactory" presented moderate to slight symptoms, not severe enough for incapacitation, or fairly marked dietary restriction. The label "unsatisfactory" was applied to those with definite symptoms causing disability; the "post-cholecystectomy syndrome" appeared in some of these, notably in only two, but interpretation of the problem has been complicated by co-existing conditions (duodenal ulcer in 1; duodenal diverticulum in 1; right kidney stone in 1; incisional hernia in 2; emotional instability in 1). In the main, the good results reflect the

TABLE X.

SUMMARY OF ALL HOSPITAL DEATHS IN THE SERIES

Primary disease	*Age*	*Operation*	*Remarks*
Carcinoma of head of pancreas			
E.G.	61	Cholecystostomy.	
W.S.	33	Cholecystjejunostomy—diabetic—peritonitis.	
M.M.	60	Resection abandoned—portal vein invaded by the growth.	
J.C.	65	Resection abandoned.	
Acute pancreatic necrosis			
J.E.	61	Cholecystectomy—died 4th day.	
D.G.	35	Exploration, drainage—secondary hæmorrhage in 3rd week.	
Carcinoma of gallbladder			
R.M.	57	Cholecystectomy—squamous cell and adenocarcinoma; died suddenly 16th day (embolus?).	
L.W.	63	Laparotomy and biopsy only.	
Common duct calculi			
A.McL.	67	Transduodenal choledocholithotomy, secondary operation for acute suppurative cholangitis, late case.	
A.M.	67	Same as above.	
Common duct stricture			
G.N.	63	3rd operation for vitallium tube repair.	
G.P.	45	4th operation.	
Acute, obstructive cholecystitis with complications, ending as "acute liver failure".			
C.McA.	55	Cholecystostomy—gangrene, abscess, pancreatitis.	
M.R.	74	Cholecystectomy, choledochostomy, etc.—empyema of g.b., refused operation over 2 weeks.	
H.R.	73	Cholecystectomy—gangrene and peritonitis.	
These were late neglected cases, running from 2 to 6 weeks in acute phase.			
Chronic cholecystitis with stones			
E.M.	63	Cholecystectomy and choledochotomy, etc. Shock.	
H.R.	34	Cholecystectomy and appendectomy—weighed 350 lbs. Fatty infiltration all organs. Pulmonary œdema.	
Biliary peritonitis			
A.W.	77	Simple drainage operation—4 previous biliary operations, especially for common duct stones.	

high proportion of cases in this series with marked symptoms and definite gross changes in the way of pathological anatomy. The policy of operating early in the course of the disease no doubt played a rôle to the same end.

TABLE XI.

FOLLOW-UP RESULTS IN 100 UNSELECTED CHOLECYSTECTOMY CASES

Excellent or good	84
Satisfactory	6
Unsatisfactory	10

SUMMARY

1. A personal experience of 429 biliary tract operations in 396 patients is analyzed with regard to leading symptoms, the various pathological conditions, the different operations performed, and the mortality related to the underlying lesion and the type of operation.

2. It is evident that biliary disease tends to be progressive; duration of symptoms surpasses all other factors in close relationship to the incidence of complications. These in turn cause disability and deaths.

3. Early operation has been proved to be safe and it constitutes the most effective prophylaxis against serious complications. The indications for different operations have been considered and the timing of intervention.

4. The importance of a complete procedure is made clear from the results, residual disease leading to prolonged distress, and often secondary operations with greatly increased hazards. The most common problems in this regard centre in residual stones in a stump of gallbladder or cystic duct, or in the common duct.

5. Treatment must be individualized for each patient at every stage, especially through the steps of a well-ordered program of preoperative and postoperative care, as well as through the technical procedures.

6. The management of acute cholecystitis is discussed at some length.

7. All aspects of common duct drainage are considered.

8. Special groups of cases are analyzed separately, *e.g.*, a small series of non-calculous gallbladder patients who had marked biliary symptoms.

9. Consideration is given to the question of combining other operations with those on the biliary system.

10. Mortality is tabulated under the various lesions and procedures. All deaths in hospital are summarized briefly.

11. End-results are presented for a group of cholecystectomy cases, followed for periods ranging from 1 to 12 years.

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THE DIAGNOSIS OF UTERINE CARCINOMA

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THE diagnosis of uterine cancer is basically dependent on two operative procedures, cervical biopsy and endometrial curettage. These diagnostic measures should be promptly recommended for all patients presenting symptoms or signs suggestive of malignant disease of the uterus.

There are two symptoms suggestive of uterine cancer, vaginal discharge and abnormal vaginal bleeding. It is unfortunate that vaginal discharge is such a common complaint that frequently no effort is made to determine its cause and that vaginal bleeding is so often functional in origin rather than organic that a functional origin is assumed and curettage and biopsy to exclude malignant disease are neglected. It is the experience of all who practise in cancer clinics to repeatedly encounter cases of carcinoma of the uterus which have been treated for weeks or months by ergot hormones or cautery before malignancy has been suspected. This is particularly tragic in carcinoma of the cervix in which extension of the disease beyond the boundaries of the cervix so adversely affects the five year survival rate. Table I shows the marked progressive decline in the five year cure rate as the extent of the disease increases.

TABLE I.

CARCINOMA CERVIX UTERI, 1929 - 1944
(868 cases)
5 YEAR SURVIVAL
ONTARIO INSTITUTE OF RADIOTHERAPY
TORONTO GENERAL HOSPITAL*

Stage	*Number of cases*	*Survival in %*
I	80	73.75
II	244	48.36
III	347	26.82
IV	197	7.61

*Courtesy of W. G. Cosbie—from paper "Factors bearing on the prognosis in cancer of the cervix" which is in process of publication.

The greatest hope for improvement of results in the treatment of carcinoma of the cervix lies in more frequent diagnosis of the disease in its early stage. This fact has been appreciated for years but the recent work of Papanicolaou and Traut, Ayre and others on vaginal smear examination has given great impetus to the study of the problem of early diagnosis. Their work has resulted in an increased awareness on the part of the profession of the importance of malignant disease of the cervix and what is equally important, a critical analysis of the methods employed in the past to detect early cervical carcinoma. It has also resulted in confusion and uncertainty about the place of vaginal smear examination in diagnosis, controversy between cytologist and pathologist in regard to the value of the method, and finally, controversy between pathologists in regard to the histological criteria necessary for the diagnosis of carcinoma in its earliest stages.

Before proceeding to a discussion of these controversial problems, it should be emphasized that few cases of carcinoma of the cervix would be missed if all patients complaining of vaginal discharge and abnormal vaginal bleeding received a careful pelvic examination with visual inspection of cervix and biopsy of any sus-

picious cervical lesion. It is unfortunately true however, that cervical carcinoma in its early stage is frequently a silent disease, and by the time symptoms occur the lesion is well established. The discovery of cases of this type depends on examination made by chance by an alert clinician. It is for this reason that the family physician should make pelvic examination with visual inspection of the cervix and biopsy, if indicated, an integral part of general physical examination. There is unquestionably an increasing demand by the laity for periodic health examination in the hope that serious systemic disease or malignancy may be discovered in its earliest stage. This is a field in which the family physician with an intimate knowledge of the patient's physical and emotional background should excel. The search for symptomless cancer by the general practitioner on his own patients seems preferable to the establishment of large cancer detection clinics where patients wait six months or more for an appointment.

CLINICAL EARLY CARCINOMA OF THE CERVIX

The clinically early carcinoma of the cervix may appear in a variety of forms, none of which conforms to the classical description of a cauliflower tumour or excavated ulcer ascribed to cervical carcinoma. The early lesion is usually situated at the margin of the external os, and most characteristically appears as a small slightly raised granular or finely papillary area closely resembling benign erosion. It may appear as a small but definite ulcer or even as a whitish plaque-like area which stands out prominently from the adjacent normal cervical mucosa. These early lesions, in nearly every instance, have the one common characteristic of bleeding following trauma, and it is this feature as much as any other that should create a suspicion of malignancy. All such lesions should be biopsied. In this regard Novak[9] states "I for one would consider it a far greater dereliction to omit direct biopsy in a clinical suspicious lesion of the cervix than to omit vaginal smear study". This quotation is not given to be critical of vaginal smear examination, but rather to emphasize the value of biopsy and to reassure those for whom vaginal smear is not available that they are not deprived of an essential aid in diagnosis of early malignant disease of the cervix.

CERVICAL BIOPSY

The biopsy must be accurately taken from the area under suspicion. If more than one area excites the doubts of the clinician then more than one biopsy should be taken. In the majority of cases an adequate cervical biopsy can be obtained in the office without anæsthetic and with little discomfort to the patient. A bivalve speculum, a good light, and one of the various type punch biopsy instruments are all that are required. If both anterior and posterior lips of the cervix require biopsy the posterior one should be taken first, so that the bleeding which results will not mask the area for second biopsy. Bleeding following biopsy is, as a rule, not troublesome, the insertion of a tampax or single strip of gauze to be removed by the patient in twelve hours will provide adequate protection. In most instances it is wise not to cauterize the cervix after office biopsy, in case the pathologist requests more tissue for examination.

Occasionally a halo of erosion about the external os of the cervix is present and no one area is more suggestive of malignancy than another. In such a case a sweeping surface biopsy of the whole area will be more representative than one or two isolated punch biopsies. This type of scraping or surface biopsy is best obtained by a small sharp curette or scalpel. The fragments of tissue obtained are usually small, and can be washed off the biopsy instrument into formalin or Bouin's solution. Subsequently they can be collected in the laboratory either by centrifuging or filtering and then put through the ordinary paraffin technique for cutting and staining. This method requires no modification of the routine in the surgical pathological laboratory and the sections can be examined in a matter of minutes. Carcinoma of the cervix may begin within the cervical canal and reach an appreciable size before it extends on to the vaginal aspect of the cervix. For this reason the endocervix should be curetted with a sharp curette at the time that a surface scraping or biopsy is taken.

VAGINAL SMEAR

Opinions vary in regard to the place that vaginal smear examination will eventually take in the diagnosis of cervical malignancy. The method has three definite advantages over

biopsy. First a smear is easily taken with no discomfort to the patient. Secondly, the smear is representative of all exfoliated cells from uterus and vagina rather than of only a small area. Thirdly, in doubtful cases smears may be repeated as often and at as frequent intervals as desired by the clinician. One major objection to the method is the time required to study each smear before a negative report may be given. This is estimated to average from ten to twenty minutes, and as two smears should be examined from each patient the seriousness of this time factor immediately becomes evident when a large number of smears have to be examined.

The accurate interpretation of vaginal smears is an art that is not quickly or easily acquired, but takes months of training and constant practice. The training of technicians to screen the smears cannot be accomplished in a few weeks, and only a few will be found to have the patience to carefully and conscientiously study hundreds of negative smears to discover the occasional positive one. The time factor and the problem of personnel are the greatest obstacles to the more widespread employment of vaginal smears. For the present at least, the method is of necessity restricted to a few large centres and the profession for the most part must depend on biopsy for diagnosis.

The accuracy of diagnosis by vaginal smear examination varies rather markedly in reported cases. Even for those skilled and of wide experience in this method of diagnosis, an error of false negatives in carcinoma of the cervix of from 2.5% to as high as 28% may occur, and an average of 10% may be reasonably expected. In carcinoma of the endometrium the number of cases missed is much higher, the error ranging from 16 to 33%. False positive reports may be expected in from 1.6% to nearly 3% of cases. Graham and Meigs[7] however state that they have reduced the incidence of false positive errors to the low figure of 0.04%. On the other hand, Scheffey[2] reports an increase in false positive reports from 1.6 to 2.6% as the percentage of false negative decreased from 30 to 18%. If full reliance is not placed on vaginal smear examination to exclude malignancy, these diagnostic errors assume less significance, particularly when it is appreciated that a certain number of early lesions will be recognized by smear and missed by clinical examination and biopsy. For example: Philpott[8] has reported the discovery, by vaginal smear, of nine cases of carcinoma of the cervix none of which appeared on clinical examination sufficiently suspicious of malignancy to indicate the need for biopsy. What may be expected in the discovery of unsuspected carcinoma of the uterus by the use of the method as a screening test is shown in Table IV.

Vaginal smear should be considered a procedure complementary to rather than competitive with biopsy. At the present time its most important rôle seems to lie in its application as

TABLE II.

	Scheffey et al.[1]	*Freemont-Smith et al.*[3]	*Hertig et al.*[5]
Total cases	500		3,327
False positive	7 (1.6%)		55 (1.6%)
Total malignancies	63	383	58
False negative	19 (30%)	51 (13%)	4 (6.9%)
Carcinoma of cervix	57	285	40
False negative	17 (28.8%)	31 (11%)	1 (2.5%)
Carcinoma of corpus	6	98	18
False negative	2 (33.3%)	20 (20%)	3 (16.6%)

TABLE III.

	Gates and Warren[20]	*Papanicolaou and Traut*[4]	*Reicher et al.*[19]
Total cases	1,300	3,014	3,500
False positive	16 (1.3%)		17
Total malignancies	81	180	
False negative	19 (23%)	11 (6.1%)	
Carcinoma of cervix		127	67
False negative		4 (3.1%)	4 (5.9%)
Carcinoma of corpus		53	18
False negative		7 (13%)	5 (27.8%)

TABLE IV.
SCREENING TEST

Philpott[8]	
4,000 cases, 9 unsuspected ca. of cervix	
Shapier[10]	
8,000 cases, 7 unsuspected ca. of cervix	
2 unsuspected ca. of corpus	
Scheffey[2]	
5,622 cases, 2 ca. of cervix, 1 unsuspected	
Kraushaar *et al.*[6]	
1,482 cases, 5 unsuspected (one *in situ*)	
1,238 cases, 2 unsuspected	

a screening test rather than a diagnostic one. Certainly all agree that a negative smear in a case clinically suspicious of malignancy should never be accepted to the exclusion of biopsy, and secondly, that a positive smear should always be confirmed by biopsy before the diagnosis of malignancy is accepted as a basis for radical treatment.

CARCINOMA-IN-SITU

The study of vaginal cytology has aroused renewed interest in the pathology of carcinoma-*in-situ*. The terms carcinoma-*in-situ*, pre-invasive cancer, and intraepithelial carcinoma are used synonymously to describe cellular changes in the surface epithelium comparable to those seen in well developed cancer. Variation in cell size, hyperchromatosis, nuclear changes and loss of polarity may all be present to a sufficient degree as to leave no doubt in the mind of the pathologist that all criteria, except invasion, are present to warrant a diagnosis of malignancy. Such cases are rare. Milder degrees of basal cell hyperplasia, anaplasia and loss of polarity are frequently seen in the cervix, particularly in the presence of cervicitis pregnancy and cervical prolapse. The classification of this type of lesion varies with the concept of the individual pathologist, but it has been my experience that since carcinoma-*in-situ* has become such a discussed subject, many of these more or less equivocal cases have been labelled pre-invasive carcinoma. In a group of nearly 400 cervices serially sectioned, we have discovered only two cases of carcinoma-*in-situ*, whereas Pund and Auerback[11] in a much larger series report an incidence of pre-invasive carcinoma of 3.9%. Some of this difference is probably due to variation in interpretation of these less marked epithelial changes which are classified by Hertig[5] as probable and possible carcinoma-*in-situ*. As pointed out by Robbins[21] "the diagnosis of carcinoma-*in-situ* rests on very subtle histologic change and the absence of invasiveness takes away from the entity the single most diagnostic feature of cancer".

The pathological status of pre-invasive carcinoma in regard to malignancy has not been definitely determined. Martzloff has stated, "there is no justification for including cases of carcinoma-*in-situ* in the general category of malignancy". The general consensus however, appears to be that the unequivocal carcinoma-*in-situ* is closely related to cancer and probably represents an early stage in the development of carcinoma, yet the evidence upon which this opinion is based is far from conclusive. Only 25 cases[12, 15] of frank carcinoma developing in cervices, the site of pre-existing carcinoma-*in-situ*, have been reported (January, 1950) and in 2 of these an interval of 9 years elapsed between the time the pre-invasive lesion was recognized and the carcinoma developed. On the other hand, the lesion has been apparently cured by simple measures such as biopsy, cauterization, and cervical amputation. Efferson[14] has reported 6 cases discovered during pregnancy, 5 of which showed complete disappearance of the lesion as determined by biopsy in the post-partum period. The sixth case was not followed. On the other hand, Galvin and TeLinde[15] found evidence of microscopic invasion in 55 of 75 cases and are of the opinion that the lesion should be considered as carcinoma. Differences of opinion however, exist as to the criteria that constitute invasion, particularly in regard to the significance of encroachment of the carcinoma-like epithelium into the cervical glands. The uncertain clinical and pathological status of carcinoma-*in-situ* has been well expressed by Novak[9] who described the lesion as one "which in an indeterminate proportion of cases is at some unpredictable time followed by invasion", *i.e.*, the development of frank carcinoma.

Occasionally a biopsy taken from the invading margin of a frank carcinoma will show only the superficial spread of the tumour on the surface of the cervix and a diagnosis of carcinoma-*in-situ* will be made by the pathologist. This possibility must always be considered by the clinician when a diagnosis of carcinoma-*in-situ* is received, and the endocervix should be curetted to exclude the presence of an unsuspected endocervical carcinoma. We have recently seen two cases

of moderately advanced carcinoma of the cervix treated by simple total hysterectomy as a result of such a mistake. Carcinoma-*in-situ* is not a lesion that warrants hasty clinical action. Each case should be individually assessed, the diagnosis confirmed by more than one pathologist and treatment instituted only after clinical consultation.

The discovery of a microscopic lesion such as pre-invasive carcinoma would appear to be a chance occurrence dependent on the taking of a biopsy or vaginal smear, regardless of the appearance of the cervix. The lesion however has been most frequently found on cervices which present areas of apparently benign erosion. In a group of 18 cases of pre-invasive carcinoma reported by Foote and Li[16] all but 3 were associated with exocervicitis and erosion. While the majority of lesions of this type have been discovered by biopsy, the vaginal smear, being representative of all desquamated cells from the cervix, theoretically at least should be more successful than biopsy in bringing to light these cases. This, however, is controversial. Hertig[5] reports 5 negative smears in 13 cases, an error of 38%, whereas Graham[17] reports 2 negative smears in 16 cases, an error of only 12%.

The success of the vaginal smear in discovery of these pre-invasive lesions when used as a screening test is shown in Table V.

TABLE V.

Philpott[8]	4,000 cases	5 ca.-*in-situ*
Shapier[10]	8,000 cases	12 ca.-*in-situ*
Nieburgs and Pund[18]	3,700 cases	22 ca.-*in-situ*
Total.....	15,700 cases	39 ca.-*in-situ*

The fact that the discovery of these 39 cases of probable malignancy required the examination at a minimum of over 30,000 smears emphasizes the futility for the present at least of creating a desire on the part of the profession and laity for the more widespread use of the method as a screening test.

CARCINOMA OF THE CORPUS

Carcinoma of the body of the uterus most commonly occurs after the menopause has been established. It is characterized by vaginal bleeding frequently preceded by or accompanied by a watery vaginal discharge. In the early stages of the disease, the bleeding may be quite scant in amount and sporadic in occurrence. Findings on pelvic examination may be negative except for the bleeding. By the time the uterus is enlarged or fixed the disease is as a rule well advanced. Occasionally, however, some benign lesion such as senile vaginitis or cervical polypus will co-exist with endometrial carcinoma and if such lesions are assumed to be the cause of the bleeding and curettage is not performed, the diagnosis of malignancy will be needlessly delayed. Similarly uterine fibroids and carcinoma of the endometrium or cervix are frequently encountered together. If supra-vaginal hysterectomy is performed for fibroids in such a case without preliminary vaginal examination and curettage, a harmful and inadequate operation will have been performed.

The cases of endometrial carcinoma which are most frequently overlooked in the early stage are those which occur during the menopausal years when functional uterine bleeding so commonly occurs. The diagnosis of functional uterine bleeding during the years of the menopause should not be made unless curettage has excluded malignant disease of the endometrium. Curettage for this purpose should be performed under general anæsthetic. The endometrial cavity should be completely curetted with a sharp curette, particular attention being directed to the uterine cornua. All currettings should be saved for microscopic examination. Office curettage with a suction curette, while adequate for the diagnosis of the menstrual phase of the endometrium, is inadequate to exclude malignant disease.

SUMMARY

The moderately advanced carcinoma of the cervix presents no difficulty in diagnosis and can be recognized in the majority of instances at the time of initial pelvic examination. Biopsy in such cases merely confirms the diagnosis. Early carcinoma on the other hand may closely resemble a benign erosion and unless the cervix is carefully inspected in a good light, the clinician may fail to even suspect malignancy. All such doubtful lesions should be biopsied.

Cervical biopsy is not a formidable procedure and can be performed in the majority of cases in the office without anæsthetic and with only slight discomfort to the patient.

The family physician by making pelvic examination a routine part of his general physical examination and by familiarizing himself with

the simple technique of cervical biopsy has a great opportunity to discover early carcinoma of the cervix.

The vaginal smear as a diagnostic test should be considered an adjunct to biopsy and never relied upon to exclude malignancy in a clinically suspicious case. Its use as a screening test when the cervix presents no area warranting biopsy will lead occasionally to the discovery of a completely unsuspected malignancy. The greatest usefulness of the method appears to lie in this field.

Carcinoma-*in-situ* is a relatively rare lesion of uncertain clinical and pathologic status. The diagnosis should be confirmed by pathological consultation, the possibility of an endocervical carcinoma excluded by cervical curettage and treatment instituted only after clinical consultation.

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You will find that it is difficult and often impossible to bring your patient those qualities of mind and spirit that are so necessary if you are to be able to cure him. But never give up trying. If the patient welcomes you gladly when you enter his room, if he hangs on your every word, if he looks forward eagerly to your next visit—you are in a position to do him great good or great harm, depending on what sort of message your presence, actions, expressions and words bring to him. See to it that that message be one of Hope, comfort, encouragement and cheer.—Lyman Allen.

RETROLENTAL FIBROPLASIA

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RETROLENTAL fibroplasia was not recorded in this area prior to 1948. Since then, however, 15 cases have been observed and, because it leads almost invariably to blindness, its importance can be readily recognized. The incidence is increasing rapidly and it is now the commonest cause of blindness in children. Reports given in papers presented at the National Conference of the Blind Pre-school Child in March, 1947, are significant: New York State, retrolental fibroplasia accounted for 21.5% of the causes of total blindness, 29.2% in New Jersey, and 41.7% in Illinois. Clifford[1] found retrolental fibroplasia in 12% of infants weighing three pounds or less at birth. Owens[2] found it to be present in 12.1% of infants weighing three pounds or less, and in 1.3% of infants over three pounds and less than four and one-half pounds. Krause[3] reports:

"The incidence of retrolental fibroplasia apparently varies with the community and the hospital. On our own obstetrical service the frequency has increased. The chances for fibroplasia in surviving premature infants with a birth weight below fifteen hundred grams was 11% in 1945, in 1946, 36%, in 1947, 45%. So far, in 1948, the incidence is 86%. In other words, it is increasing up to a maximum limit. We do not know the percentage of fibroplasias in stillborn cases."

It occurs on a regional basis and is prevalent in such areas as New York, Boston, Baltimore, Chicago, Portland, Oregon, and Vancouver. It is rare in California, Georgia, and the British Isles. It is prevalent in one county but not necessarily in the adjacent ones and is often found in one or more of the hospitals of a city so affected but not in all of the hospitals of that city.

Opacities, partial or complete, appearing shortly after birth and situated behind the lens, have long been known and the difference between retinoblastoma, congenital cataracts and an opaque membrane immediately post-lental was early appreciated. This retrolental membrane was noted by many authors, each having

a different name for it based on the author's conviction of its etiology. Nineteen such different names are to be found in the literature. In 1941, T. L. Terry[4] recorded the incidence of an opaque membrane behind the lenses of a premature infant remarkable for its light birth weight. To this condition he eventually[5] gave the name of retrolental fibroplasia.

The clinical picture varies with the stage at which the condition is discovered. The usual history is that the mother comes to her doctor anywhere from the third to the eighth or ninth month of her baby's post-natal life complaining that the infant does not appear to see properly or that a membrane can be seen in the pupils. Some mothers have been certain that the baby could see for several months before the greatly-reduced vision became apparent. There is almost always a history of prematurity as determined by birth weight and this is usually under three pounds. In many cases, multiple hæmangiomata are seen.

Physical examination reveals a baby that is usually well-developed for its age. The infant appears to fix light poorly or not at all. The child does not reach for objects presented to it, usually has a pronounced photophobia and often characteristically uses the backs of the hands to rub the eyes. Some of them appear to have tender eyeballs and will not tolerate palpation. The eyelids are often closed, the eyes slightly sunken in the orbits and are smaller than normal. Both eyes are invariably involved. Close examination reveals a varying degree of greyish membrane filling the pupillary aperture and this, even in an undilated pupil, appears to be very deep to the plane of the iris. The anterior chamber is shallow, the cornea is small, the pupils respond poorly to light and mydriatics, and the iris is lighter in colour than normal. There may be anterior synechiæ due to the narrow anterior chamber, or posterior synechiæ. The membrane itself varies in colour from grey to white and may be complete or partial, in which case the normal red reflex of the fundus is visible with the ophthalmoscope. This membrane can vary from time to time, getting denser in the initial stages of the disease process, often becoming thinner some months later. Examination of the dilated pupil under general anæsthesia is necessary to help clarify the diagnosis. At this time the pathognomonic dentate formation due to the lengthened ciliary processes can be seen. These appear to be like blunt teeth of a comb. They are normal in infancy, become longer in retrolental fibroplasia and are readily seen against the grey membrane.

Owens described the onset and course of the disease in nine cases. He noted an early dilatation of the blood vessels of the fundus followed by detachment of the retina beginning near the periphery and extending to involve all of the retina which then gradually folded up behind the lens to form the membrane.

Prophylactic treatment has been tried without success. Equally unsuccessful has been (*a*) treatment by radiation once pathology has been noted, or, (*b*) treatment by surgical removal of the formed membrane.

The etiology of retrolental fibroplasia is unknown. Prematurity is the outstanding antecedent but no one considers that prematurity, *per se*, is the cause. A great variety of factors have been studied to determine their etiological significance. Among these are: heredity, multiple births, diseases of the mother or child, drugs, chemotherapy, mechanism of delivery, pre- and post-natal hæmorrhages, lack of vitamin K or E, incomplete homothermism, premature exposure to light, premature loss of certain hormones, inefficient nutrition, physiological anæmia, and germicidal lamps. As yet, no one factor has proved to be responsible or entirely guiltless.

In reviewing the cases of retrolental fibroplasia which have occurred in the City of Vancouver, it was found that 13 of the 15 cases came from one hospital having ideal conditions for the care of prematures, and at which the survival rate has been very high. The twelfth case came from another large institution in this city, and the thirteenth came from a large hospital in a neighbouring city. In the City of Vancouver, approximately 100% of the premature infants are hospitalized in three hospitals. Inspection of the routine practice of the three institutions revealed that the hospital in which 13 of the cases occurred gave early and repeated transfusions of pooled stored blood to all infants showing an anæmia, whereas the other two hospitals rarely followed this procedure. In the other two cases no history of transfusions could be obtained. We, therefore,

feel that transfusions of pooled stored blood to premature infants must be considered as a possible cause of fibroplasia.

DISCUSSION

Practically all cases of retrolental fibroplasia occur in large centres where facilities for transfusion are available. It is rare in rural areas where such a technique is unavailable. A variation in the incidence from city to city and from hospital to hospital within the same city is again compatible with a variation in technique such as transfusion. The earliest clinical manifestation of retrolental fibroplasia occurs about one hundred days, or three months, after the transfusions, which are usually given almost immediately after birth. In a similar manner, homologous serum jaundice occurs about one hundred days after transfusion. It is possible that in pooled blood there may be a factor as yet unknown that, on the one hand can cause retrolental fibroplasia in predisposed individuals, and in other individuals can cause homologous serum jaundice.

The fact that two of the cases did not give a history of having received transfusions does not invalidate the possibility that transfusions are the cause of retrolental fibroplasia. Since the last two cases were seen in the terminal stages of the condition from which they suffered, and since an adequate examination of the fundus was not possible, there is a possibility that one or both of these cases may have been suffering from a persistence and hyperplasia of the tunica vasculosa lentis and not retrolental fibroplasia.

CONCLUSION

A description of retrolental fibroplasia, its clinical picture and suspected etiological factors has been presented with special reference to blood transfusions as a possible causative agent. This paper has been presented to stimulate a review of known cases to ascertain if transfusions are a factor in the etiology of this most distressing condition.

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METHADONE AND RESPIRATORY TRACT FLUID

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METHADONE is a synthetic drug which is more powerful than morphine for the relief of severe pain. The compound was prepared at the Hoechst plant of I. G. Farben in Germany during World War II and was investigated by a group appointed by the U.S. Department of State at the conclusion of hostilities.[1] The substance is known as Compound 10820, dolophine, miadone, physeptone, methadone and amidone. The name methadone was adopted by "New and Nonofficial Remedies" of the American Medical Association. The drug may be shown to have some relation to morphine in chemical structure. In the form of the water soluble hydrochloride salt, it is a white, crystalline powder therapeutically active when given by mouth in doses of 2.5 to 10 mgm. The chief indications for its use are to relieve severe pain, for renal colic and against severe cough. Tolerance develops and the drug may be habit-forming.

Like morphine, methadone is particularly useful in the treatment of severe cough. The Germans used it to some extent for this purpose during the second World War and it has received considerable clinical trial since, often in the form of a syrup of methadone hydrochloride.[2] Little is known about the mechanism of action of methadone as an antitussive. From analogy to morphine, methadone is generally considered to have a probable depressant action upon the cough centre. Since both of these drugs are very effective against severe, persistent, dry, non-productive coughs, there is the possibility that they may have a peripheral action, increasing the output of respiratory tract fluid. In a previous communication to this Journal,[3] subcutaneous injection of morphine hydrochloride was reported to have no effect upon the volume output of respiratory tract fluid in albino rats. The investigation herein summarized and reported was a similar study of the effect of methadone hydrochloride upon the output of respiratory tract fluid.

Four different species of animals were used with the idea that if identical results were obtained in all species, extrapolation to man of any conclusion reached could be made with

reasonable assurance. Experiments were performed upon cats, rabbits, guinea pigs and albino rats. Each animal was anæsthetized with urethane injected interstitially in the groin at a dose of 1 gm. per kilo body weight which produced a light surgical anæsthesia corresponding to Guedel's Plane I. General anæsthesia was supplemented with local anæsthesia when required. The animals were operated upon and arranged for collection of respiratory tract fluid by techniques which have been previously described.[4, 5]

The output of respiratory tract fluid was noted at successive intervals of 0.5 to 1 hour and the volume calculated as ml. per kilo body weight per 24 hours. The rate of output of this fluid varies to some extent from animal to animal and from hour to hour but when mean values are calculated for several animals, the average output is fairly constant for any one species and after the first hour of collection. These mean values are of the order of 2 to 4 ml. per kilo body weight per 24 hours for cats and rabbits and 5 to 10 ml. for guinea pigs and albino rats. The fluid is colourless or of a pale yellowish tint with portions of floating mucus and small amounts of protein, glucose and inorganic constituents.[6]

Several cats and guinea pigs were given no further treatment, respiratory tract fluid was collected and measured during the six or seven hours of the day remaining after operation, the data averaged and presented in Table I. The results obtained were similar to those previously described for control animals.

In the remaining animals, methadone hydrochloride was administered three hours after the animals had been operated upon and arranged for collection of respiratory tract fluid. A three hour postoperative interval was selected because it is sufficient to obtain stable normal values for the rate of output of respiratory tract fluid. The drug was dissolved in a small volume of sterile distilled water, injected subcutaneously in some animals and given orally by stomach tube in others. The smallest dose used was 0.1 mgm. per kilo body weight which corresponds to the therapeutic dose in man when calculated by Clark's body weight rule. Other doses employed were 0.5, 1.0, 5.0 and 10 mgm. per kilo body weight. Each dose was administered by one route, usually to two animals in each species. The output of respiratory tract fluid was followed for a further period of four hours subsequent to administration of methadone hydrochloride.

The results obtained have been summarized and presented in Table I. A total of 13 cats were injected with methadone. No dose of the drug had any significant or consistent effect upon the rate of output of respiratory tract fluid during the period of time that observations were recorded. Hence all the data were averaged at hourly intervals and the resultant

TABLE I.
THE EFFECT OF METHADONE HYDROCHLORIDE UPON THE OUTPUT OF RESPIRATORY TRACT FLUID

Species	*No. of animals*	*Dose: mgm.* per kilo*	*Output of respiratory tract fluid (ml. per kilo per 24 hrs.)*						
			1 hr.	*2 hr.*	*3 hr.*	*4 hr.*	*5 hr.*	*6 hr.*	*7 hr.*
Cats	19	0	2.3	2.9	2.8	2.9	2.6	2.7	
"	13	0.1 to 10 S.C.	2.1	2.3	2.6	2.6	3.1	2.6	2.7
"	10	0.1 to 10 P.O.	4.8	3.6	3.0	3.5	4.0	3.7	3.0
Rabbits	12	0.1 to 10 S.C.	2.7	3.5	3.2	3.0	2.8	2.7	3.4
"	7	0.1 to 10 P.O.	1.3	3.0	3.2	3.7	4.3	2.3	4.8
Guinea pigs	10	0	0.1	2.3	5.4	5.8	7.2	3.7	4.3
"	11	0.1 to 10 S.C.	4.9	5.0	5.3	5.3	5.1	5.4	6.0
"	10	0.1 to 10 P.O.	2.1	6.3	6.2	4.2	4.0	4.8	4.7
Albino rats	10	0.1 to 10 S.C.	5.1	8.9	8.3	9.1	8.0	11.2	7.2
"	10	0.1 to 10 P.O.	3.2	10.8	13.6	9.8	8.7	9.7	7.5

*Methadone hydrochloride was given subcutaneously (S.C.) or by stomach tube (P.O.) at the end of the 3rd hour of the experiment.

means are given in Table I. Twelve rabbits received methadone subcutaneously without any appreciable alteration in the production of respiratory tract fluid. Similar negative effects were obtained by subcutaneous injection of methadone in 11 guinea pigs and 10 albino rats. Since no dose had any definite effect upon the output of respiratory tract fluid in these animals, data from all animals of each species have been averaged on an hourly basis, as for cats, and these means given in Table I.

Methadone, like morphine, may be given orally as well as hypodermically and hence a parallel series of experiments was made with methadone hydrochloride administered by stomach tube. Using the same dosage range as was employed for hypodermic injection, the drug was given to 10 cats, 7 rabbits, 10 guinea pigs and 10 albino rats. No dose of the drug had any demonstrable effect upon the rate of output of respiratory tract fluid in any of these animals. The average hourly rates of output were calculated and have been included in Table I.

In none of these experiments was it possible to demonstrate that methadone hydrochloride had any significant effect upon the rate of output of respiratory tract fluid during a period of four hours following its oral or subcutaneous administration. Since methadone is readily and quickly absorbed, it is very unlikely that there would have been any delayed effect upon respiratory tract fluid. Since identical results were obtained from guinea pigs to cats and from albino rats to rabbits, it seems reasonable to conclude that methadone has probably no effect upon the rate of output of respiratory tract fluid in man. This leads to the conclusion that when methadone is used to allay severe cough, it is acting probably by depressing the cough centre and not through a peripheral stimulation of the output of protective and soothing respiratory tract mucous fluid.

SUMMARY

Methadone, like morphine, is an effective drug in the treatment of severe cough. The mechanism of antitussive action of both of these drugs is generally believed to be a depression of the cough centre. A study was made to find if methadone could act further by augmenting the output of respiratory tract mucous fluid. The drug was administered subcutaneously and orally, in doses from 0.1 to 10 mgm. per kilo body weight, to a series of cats, rabbits, guinea pigs and albino rats. In no instance was there any significant change in the rate of production of respiratory tract fluid. These results indicate that when methadone is used as an antitussive agent, it is very unlikely that it influences the secretion of respiratory tract mucous fluid.

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ADAMANTINOMAS

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THE adamantinoma, although an uncommon tumour of the jaw, has been recognized for almost a hundred years. In spite of this, it is often inadequately treated, or treatment is delayed because of its supposedly benign character. In order to elucidate some of the clinical features and therapeutic problems involved, the files of the Saskatchewan Cancer Clinics were reviewed. No attempt was made to ferret out the truth from the maze of pathological controversy with regard to probable origin and histogenesis of this lesion. The aim is rather to focus attention on the natural history of the disease in order to determine the most effective treatment.

Frequency.—In 26,366 cases registered at the Regina and Saskatoon Clinics, 11,743 were malignant. Only eight or 0.07% were diagnosed as adamantinoma. All the cases with one exception were diagnosed histologically. This one case presented the typical history and x-ray findings, but elected to be treated elsewhere, and has been lost.

Site.—A review of the literature suggests that 85% of the cases occur in the lower jaw, but it has been pointed out by Willis that it seems likely many adamantinomas of the upper

jaws are wrongly diagnosed as carcinoma of the antrum. This is especially so if a biopsy is not done, because frequently the x-ray pictures are indistinguishable. The sites of the lesions in this series were equally divided between the upper and lower jaws.

Age.—The age of onset varied from 28 to 68 years with an average of 52 years. When it is considered that these tumours are slow growing and may be present for long periods before being recognized by the patient, the accuracy of these figures is doubtful. Robinson in a survey of the literature gives the average age of onset as 35 years. The duration of the lesions before reporting for treatment varied from 2 months to 28 years with an average of 7.5 years.

Clinical features.—The lesion usually presents itself as a slow growing painless lump bulging the facial contour outwardly, but the lingual aspect of the jaw may be expanded, making the swallowing of food difficult. When the maxilla is involved, the posterior nares may be obstructed, leading to many of the signs which have come to be associated with nasopharyngeal tumours; mouth breathing, unilateral nasal discharge and deafness may be sequelæ to this form of lesion. The trauma of food passing over a taut mucosa with its impoverished blood supply often results in a chronic ulceration, so suggesting osteomyelitis of the underlying bone. With the thinning of the overlying bony cortex by the expanding tumour an "egg shell" crackle can sometimes be elicited. Soft areas of fluctuation or a hard bony surface may present to the palpating hand. As the growth does not infiltrate widely, the overlying skin or mucosa is freely mobile, unless a superadded inflammatory ulcer or sinus anchors it.

Pathology.—Grossly, adamantinoma can be roughly divided into two groups; one solid, the other cystic. However, the division is not absolute and many lesions show hybrid forms. The cystic form may show cysts of varying sizes or one single cyst may monopolize the tumour. The cut surface of the solid areas reveals friable greyish tumour tissue frequently splashed with areas of hæmorrhage and necrosis. There is a tendency to encapsulation and this feature has been the cause of numerous recurrences, for the adamantinoma like the fibrosarcoma of soft tissues cannot be cured by enucleation of the "encapsulated" tumour.

When cysts are present, their contents vary in colour and consistency. The contents may be thin and contain necrotic debris, giving a muddy coloration, and blood is frequently seen, giving a dark brown colour. Often solid areas undergo liquefaction necrosis and yield a thick purulent appearing fluid. The cystic growth, especially when of the multiple type, does not have the same clear cut boundaries as the solid, so making adequate demarcation more difficult for the operating surgeon, who will also tend to be as conservative as possible.

The adamantinoma is reputed to arise either from the enamel organ itself, or from the clumps of epithelial debris left behind after the degeneration of the invaginating stock of oral ectoderm from which the enamel organ is formed. Similar lesions have been reported in the region of the pituitary where there is an invagination of ectoderm in the embryo. The lesions which have on occasion been reported in the tibia appear to arise in aberrant epithelial structures that may be present from birth or be implanted deep to the periosteum by injury.

The microscopic features vary somewhat from lesion to lesion and in different parts of the same lesion. The structure is often one of solid clumps of dark staining epithelial cells resembling those of the basal cell carcinoma of the skin; areas of squamous metaplasia may or may not be present, so making distinction from squamous cell carcinoma difficult. Some areas may resemble those seen in the developing enamel organ with a peripheral layer of dark staining cells and a central area of stellate reticular structure, which may be solid or show cystic change. Unerupted teeth are occasionally engulfed by the developing tumour, but do not appear to be part of the neoplastic process. This feature leads to difficulty in radiological distinction of the dentigerous cyst which has as a distinctive feature the presence of a formed tooth within a cystic cavity. This is especially true in youth when unerupted teeth are present.

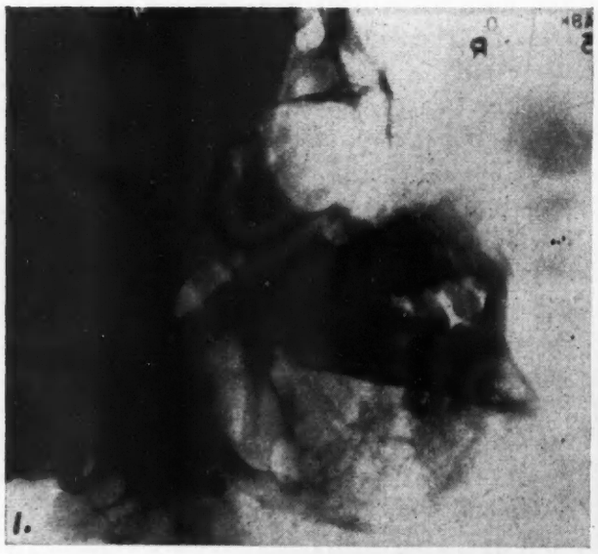
Metastases.—The adamantinoma does not frequently metastasize. McGregor has however, collected ten cases in the literature which acted in this manner. The draining lymph nodes were the sites most frequently involved, but five cases showed lung secondaries. No particular histological pattern predominated in these lesions, but repeated inadequate surgical treatment often preceded the appearance of second-

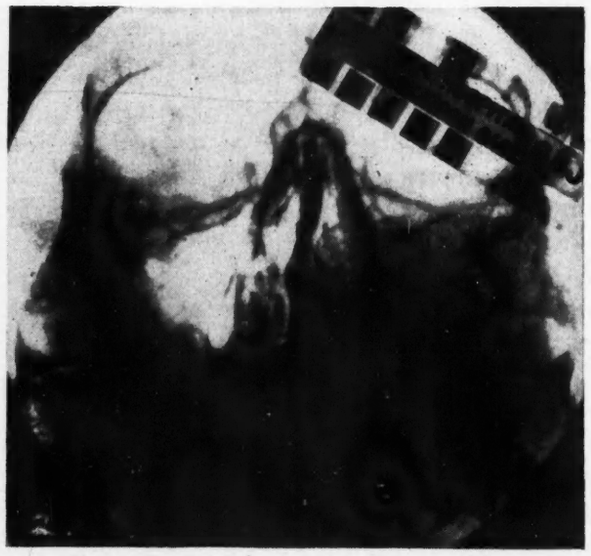
ary involvement. Catlin has recently reported a case in which the nodes were involved at the first examination. In the present series no case showed metastases. One case was diagnosed as such clinically and a block dissection of the neck was carried out. Subsequent histological examination did not substantiate the clinical diagnosis.

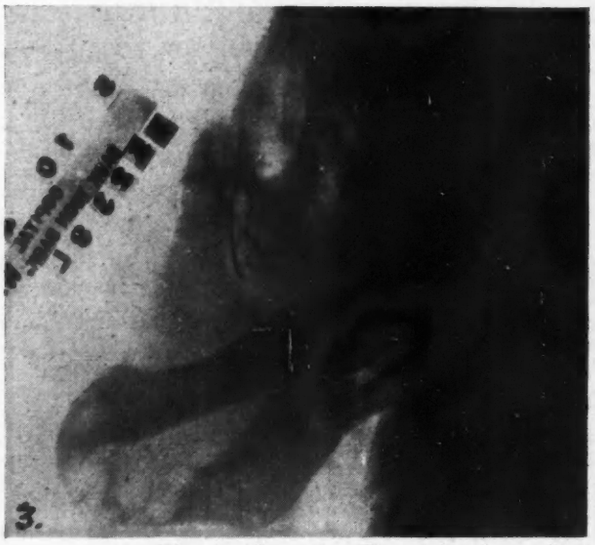
Diagnosis.—The diagnosis of this condition depends on (1) clinical history and physical examination; (2) x-ray films; (3) biopsy.

Painless and slow but relentless growth is a distinguishing characteristic separating the adamantinoma from the more malignant bone neoplasm of the jaw such as sarcoma and secondary carcinoma. The benign giant cell tumour likewise grows more rapidly and usually the history is of less than one year's duration. The physical examination confirms the presence of an expanding tumour. Occasionally an "egg-shell crackle" can be elicited.

X-ray examination reveals the nature of the lesion and the extent to which it has involved the jaw. The main feature is a centrally expanding tumour which bulges the overlying periosteum outwards. The margins are usually clear cut and may even show some sclerosis. There is not the indistinct border due to erosion or periosteal involvement seen in secondary carcinoma or osteogenic bone sarcomas. New bone production as seen in osteomyelitis, osteogenic sarcomas and some osteoplastic secondary carcinomas such as in the prostate, is absent.







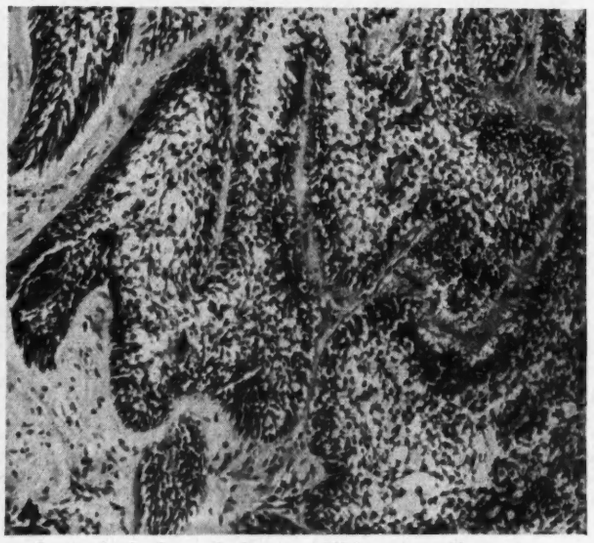


Fig. 1. (Case 1).—X-ray showing a large polycystic lesion of the mandible expanding the periosteum. **Fig. 2.** (Case 5).—Showing obliteration of the right antrum and destruction of its medial wall. Differentiation from a carcinoma of the antrum is impossible from the film. **Fig. 3.** (Case 7).—Showing moderate involvement of the mandible by a polycystic lesion. **Fig. 4.** (Case 7).—Showing the stellate reticulum and dark staining cells of the adult adamantinoma.

A central area of translucency which may be unilocular or show numerous trabeculæ traversing the lesion is present. In the latter case it becomes indistinguishable from the giant cell tumour which is also a centrally expanding lesion. Dentigerous cysts with their enclosed teeth are often difficult to differentiate from the adamantinoma. This is especially true in the younger patients who possess unerupted teeth which have been engulfed by the expanding growth. Apical root cysts do not usually become large enough to cause trouble in diagnosis. If the lesion is located in the upper jaw and has grown to such an extent that it obliterates the antrum, the x-ray picture may not be of any help in distinguishing between the adamantinoma and a carcinoma of the antrum.

A biopsy remains the last court of appeal, and is necessary in every case for confirmation of the diagnosis. As in all biopsies, they should be adequate in amount and taken from a representative area. Aspiration biopsies put an added, unfair and unnecessary burden on the pathologist, who has troubles enough in this day of cytological diagnosis. We should not be guilty of adding another straw.

CASE HISTORIES

CASE 1

No. S-3975, aged 72, admitted to Clinic July 4, 1944, complaining of a lump on the right lower gum present for four years. It began as a "boil" which would repeatedly enlarge and break, each time growing larger. It was not tender. Examination showed a tumour 7 cm. in diameter, involving the right lower jaw. The draining nodes were not involved. X-ray showed a large loculated cystic lesion, probably adamantinoma. July 10, 1944—tumour curetted. X-ray showed inadequate removal. October 22, 1945—wide curettement. Patient died July 16, 1947, with residual tumour. Cause of death was coronary occlusion.

CASE 2

No. S-6742, aged 65—admitted to Clinic December 6, 1946, with a history of a "tooth abscess" 34 years before, radium treatment to the jaw 12 years before and a discharge from the jaw treated with x-ray, 10 years before. He was well until 3 months before admission, when he noted an ulcer after a tooth extraction situated on the left lower jaw. This was not sore and there was no swelling. Examination showed a 0.5 cm. punched out ulcer on the left lower alveolus in the canine region. The base of the ulcer was filled with hard particles. X-ray showed three circumscribed areas of bone destruction. A biopsy showed adamantinoma. December 27, 1946—area curetted. Persistent sinus and x-ray evidence of inadequate removal. July 29, 1947—curetted. October 18, 1947—tumour bearing area resected. November, 1949—no recurrence clinically or radiologically.

CASE 3

No. S-1074, aged 50, admitted to Clinic July 17, 1936. For two months noticed a small non-tender swelling on the right alveolus and hard palate, measuring 2 cm. in diameter. Congestion of right nostril present for two weeks. X-ray showed clouding of the right antrum. Biopsy of the tumour which penetrated the antrum showed malignant adamantinoma. Patient was treated with interstitial radon and x-ray. The tumour disappeared. The palate was closed with obturator. June, 1949—no evidence of recurrence. No difficulty with speech or swallowing.

CASE 4

No. R-2349, aged 48, male, admitted to Clinic September 30, 1937, complaining of watery discharge and obstruction of the right nostril for one year. There was a gradually increasing swelling of the right upper jaw for the past six months. Examination showed bulging of the lateral wall of the nose and roof of the mouth with thickening of the right upper alveolus. The right antrum did not transilluminate and the x-ray diagnosis was sinusitis. October 15, 1937—biopsy showed adamantinoma. October 15, 1937—radical resection was done with removal of the orbital plate. September 30, 1938—biopsy of heaped up tissue on the edge of the palate showed chronic inflammation. March, 1940—cavity full of tumour; curetted. Healed well. January, 1941—recurrence; again curetted. October, 1941—diplopia due to ptosis of eye which was then removed. January, 1942—recurrence—x-ray given. August, 1942—no evidence of recurrence. Died July, 1943—cause pneumonia. State of tumour at time of death unknown.

CASE 5

No. S-5406, female, aged 64—admitted November 30, 1945, complaining of numbness of the right face, swelling of the right cheek and blockage of the right nostril with watery nasal discharge and some difficulty in swallowing—all of gradual onset beginning six months previously. Examination showed fullness of the right cheek, bulging of the inferior turbinate towards the midline. There was bulging of the posterior part of the hard palate by tumour which was very hard. The overlying mucosa was intact, but somewhat engorged. The tumour seemed to invade the upper part of the right tonsillar fossa. The upper groups of cervical nodes on the right were enlarged and matted together. X-ray showed "density in the right antrum with destruction of the lateral wall consistent with malignancy of the antrum". December 5, 1945—biopsy showed "malignant adamantinoma". The lesion was considered inoperable and a course of x-ray was given. October 17, 1946—right maxilla resected. November 22, 1946—block dissection of neck glands showed chronic inflammation only. June 2, 1948—recurrence along the border of the remaining portion of hard palate confirmed by biopsy. Palliative radiation given. Tumour again regressed. April 20, 1949—recurrence of tumour—treated with central radium tube into the tumour mass—6,000 r at 2.5 cm. December 5, 1949—no evidence of recurrence. This tumour can be definitely considered as radiosensitive.

CASE 6

No. S-1286, aged 51, admitted to Clinic May 4, 1937, complaining of a slowly growing lump of the left lower mandible for 23 years. Examination showed a lobular solid painless tumour of the left lower jaw measuring 10 x 6 cm. There was no lymph node enlargement. Patient refused surgery and was treated with interstitial radium and x-ray. The tumour regressed. However, it again recurred.

CASE 7

No. S-11077, female, aged 68—admitted May 27, 1949, complaining of a swelling on the left lower jaw for 28 years. The growth was slow and began shortly after having her teeth removed. In 1940 a curettement of the "cyst" was carried out and the report was adamantinoma. The swelling returned and has progressed slowly. Examination showed a fusiform expansion of the left mandible beginning 1 cm. behind the mid point of the jaw and measuring 4 by 3 by 3 cm. The buccal mucosa was stretched over the tumour but there was no ulceration. The draining nodes were not enlarged. X-ray examination revealed "multilocular adamantinoma". Wide excisional surgery was recommended but was refused. In consequence a course of x-radiation was given. No evidence of tumour progression was observed six months after treatment.

TREATMENT

These tumours have been treated in many ways with varying degrees of success. The most popular and least efficient method is that of simple curettement. Following this, recurrences appear to be inevitable, for almost invariably a small remnant of tumour escapes the curette, especially in multilocular types. Growth is then resumed and a full blown recurrence appears. Often times this takes months or years and gives the surgeon as well as the patient a false sense of security. As to the end results of treatment, no case in the present series was cured by this form of treatment. As this fact became more generally realized, caustic chemicals were applied to the tumour bed at the time of curettement in an effort to improve the results. Results did improve slightly but it is unreasonable to believe that this method can compete with resection of the tumour with an adequate margin of normal tissue. The principles of cancer surgery seem to be as valid in tumours of slow growth as in the case of their more malignant brothers.

Those who comply with the sound principles of cancer surgery and employ wide and adequate resection can with justification point to superior results. The lower jaw lends itself readily to excisional surgery and if the growth is small and especially if the lesion is on the inferior ramus, plastic repair of the defect by means of bone grafts may be undertaken. Should the ascending ramus be involved or if the bone defect cannot be adequately bridged, a hemisection of the jaw appears to be the procedure of choice. This prevents the displacement of the superior fragment upward and medially by the strong action of the temporal and internal pterygoid muscles. In this way, there is no interference with the act of swallowing.

If the superior maxilla is the site of the lesion, it may be resected, using the method of Fergusson, leaving the floor of the orbit intact. When healing is complete an obturator may be used to close the defect and restore speech and mastication to normal. The involvement of the regional lymph nodes poses a more difficult problem. The primary tumour may be controlled by excision and the nodal involvement by a block dissection of the neck. This is preferably done at one sitting, but the neck dissection may have to be delayed should the patient's condition not tolerate the more extensive procedure.

Irradiation as a method of treatment has been universally condemned. However, the number of cases so treated has been small and they were treated by techniques and dosages now considered obsolete. A survey of the present series showed that some of these tumours are radiosensitive. All those which demonstrate this property have been located in the upper jaw. One case (S-1074), was cured. A second (S-5406) deemed inoperable showed such a good response to palliative dosage of x-ray that it was technically possible to resect the tumour. When this recurred again, a second course of palliative x-radiation caused the disappearance of the recurrence. This, however, was not permanent, and a subsequent recurrence was treated radically with a single tube of radium into the central portion of the tumour. The tumour again disappeared and while the time elapsed has not been sufficient to say whether the lesion is cured, its radiosensitivity cannot be denied. A third case (R-2349) showed diminution of the tumour after x-ray therapy given in palliative doses following repeated surgical failures. However, the patient died six months after treatment of pneumonia, and the full value of the therapy could not be assessed.

Of the two cases in which the lesion was located in the mandible, and who refused surgery, one (S-1286) was a failure and has residual tumour. The second (S-11077), has not shown a definite response in six months but this is too short an interval in bony lesions to form an opinion as to the radiosensitivity.

It may be argued that those tumours showing response were carcinomas of the antrum and not adamantinomas. In each case, the slides were reviewed by our pathologist, who concurred in the previously made diagnosis.

SUMMARY

1. The clinical features of seven cases of adamantinomas are reviewed.

2. The adamantinoma is a rare slow growing tumour of the jaw with malignant potentialities.

3. Radical surgery is the treatment of choice.

4. Radical irradiation may have a place in the treatment of certain cases.

Thanks are extended to Dr. D. F. Moore, Pathologist to the Saskatoon Cancer Clinic for his review of the pathological material.

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CASE REPORTS

CHROMOBLASTOMYCOSIS IN A CANADIAN AIRMAN SERVING IN CEYLON

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This report of chromoblastomycosis acquired in Ceylon, as far as the author knows, is the first record of the presence of this infection in the India area. It should also serve as a reminder to Canadian practitioners that with the advent of swift global travel they are called upon to include "rare" conditions in their differential diagnoses.

Chromoblastomycosis is a mycotic infection of the skin which is due to the organisms *Hormodendron pedrosoi, Hormodendron compactum,* or *Phialophora verrucosa.*[1] Other fungi can produce the same clinical picture, one such report being of Canadian origin.[2] The legs and the feet are the common sites of involvement, though the head or any other exposed area may be implicated. More than half of all reported cases are in the 30 to 50 year age group, the overwhelming majority being males.[3] Practically all infected persons have been manual labourers, agricultural pursuits and contact with wood seeming to be prerequisites.[4]

The geographic distribution of the disease has led to the remark that it is largely a South American problem—the great number of reported cases having emanated from that continent. The New England, the South-eastern United States, Central America, Eastern Europe, and South Africa areas have a lesser concentration of reported infections. No typical cases have been specifically reported from Canada.

The clinical forms of the disease are described as: (1) Verrucous. (2) Tuberculoid. (3) Syphiloid. (4) Psoriasiform. (5) Cicatricial and elephantiasic.[5] The organism affects only the skin and produces a cutaneous reaction which can rarely be clinically differentiated from tuberculosis verrucosa cutis, syphilis, yaws, blastomycosis, leishmaniasis, rhinosporidiosis, coccidioidal granuloma and epithelioma.[3, 6] Biopsies must always be taken and a careful search made for the offending organism before a diagnosis can be established. Cultures on Sabouraud's medium should be made for positive identification of the fungus.

The microscopic changes in the tissue generally suggest a tuberculous process.[7] There is usually hyperkeratosis and pseudoepitheliomatous hyperplasia. The corium often shows an intense infiltration, œdema, and fibrosis. Finding of the organism is necessary for diagnosis. The organisms are often in clumps but may be single. Though minute abscesses are the usual site they are often found in giant cells. The spore form, which is the phase found in the tissues, is characterized by its brown colour, and by its septation—the latter indicating its characteristic tendency to divide by splitting rather than by budding.

R.P., a white male office worker, aged 54 years, presented himself as a private patient complaining of an eruption about the lips. In the course of the subjective enquiry he remarked upon a persistent gradually enlarging asymptomatic lesion on the left leg. The lip lesion was diagnosed as a recurrent herpes simplex. Attention was focused upon the leg lesion which suggested by its appearance tuberculosis verrucosa cutis, tertiary syphilid, blastomycosis, and epithelioma.

The patient was born in Hampshire, England in 1894. In 1906 he emigrated to Woodstock, Ontario and in 1911 moved to Young, Saskatchewan. In 1916 he enlisted in the Canadian Army and served in England, France, and Germany. In 1919 he was demobilized and shortly after pensioned for bronchiectasis. Subsequently he lived in Saskatchewan, Alberta, and British Columbia. In 1932 he travelled in the United States but confined his touring to the north border states and California. In 1940 he enlisted in the Canadian Army as a cook and served on Vancouver Island. In 1941 he transferred to the R.C.A.F. in the same capacity, and after two months on the west coast station was posted to Britain. Thence he was posted to Ceylon and en route by ship he was ashore at Capetown and Bombay. He served in Ceylon from May 1942 until May 1944. He, together with his comrades, frequently walked about the countryside wearing tropical shorts with the regulation stockings rolled down about the ankles. He often scratched and scraped his legs on bushes but he remembers no particular incident. Before leaving Ceylon he observed a small asymptomatic area, about one-quarter inch in diameter on the lateral aspect of the left leg somewhat above the ankle. Upon demobilization he gave the lesion so little thought that he failed to mention it to the examining physician. Since its onset the area has slowly increased in size and deepened in colour.

General physical examination was not contributory. There was a mild degree of leucoplakia of the right buccal mucosa present. The chest showed markings typical of bronchiectasis. The blood Kahn and complement fixation tests were negative. Red blood cells 4,640,000, Hb. 88% (12.2 gm.), white blood cells 9,950, polymorphonuclears 60%, lymphocytes 39%, eosinophils 1%, monocytes and basophiles 0%. Urinalysis: specific gravity 1.012, pH. 5.5, albumen negative, sugar negative, microscopic: white blood cells 1 to 2 per high power field. Examination of the skin of the lower third of the left leg revealed an ovoid flat somewhat violaceous hyperkeratotic lesion on the lateral aspect measuring 1½ inches by 1 inch overall. There was little infiltration and no regional adenopathy was found.

Two biopsies were taken before a definite diagnosis could be made. The microscopic picture was not diagnostic until the organisms were found. There was hyperkeratosis, pseudoepitheliomatous hyperplasia, infiltration of lymphocytes and plasma cells, together with the formation of a few giant cells and of small abscesses

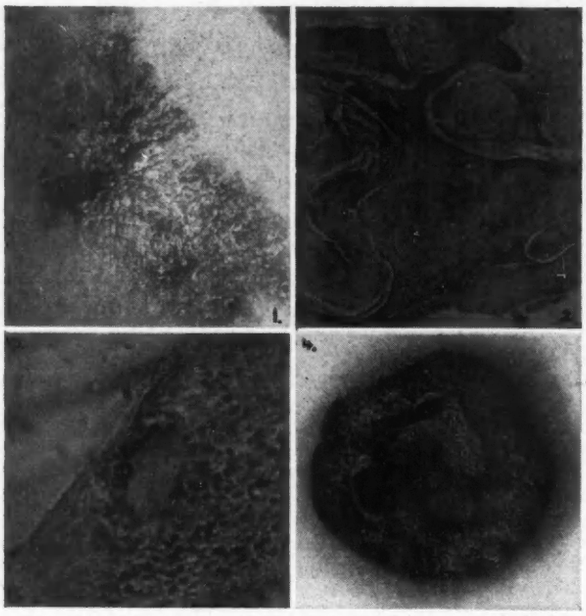

Fig. 1.—Close up photograph of lesion on left leg. The black area is the site of a biopsy. **Fig. 2.**—Pseudoepitheliomatous reaction of the affected skin. Low power. Hæmatoxylin and eosin staining. **Fig. 3.**—Two spores of Phialophora verrucosa engulfed in a giant cell. High power. Hæmatoxylin and eosin staining. **Fig. 4.**—Culture of organism from tissue on Sabouraud's medium—Phialophora verrucosa.

containing polymorphonuclear cells. Typical brown segmented spores were found in the abscesses and adjacent to giant cells. The organisms were few in number and many were sclerotic in appearance. Culture of the fungus on Sabouraud's medium resulted in a brownish black colony which was identified on culture mount as *Phialophora verrucosa.*

The treatment of patients with the condition described above consists in removing the involved skin. This may be done by excision or by curettage and cautery.

SUMMARY

A case of chromoblastomycosis has been described. The lesion was a nondescript granuloma and diagnosis rested upon microscopic and culture findings. Presentation of this patient is made for two reasons—firstly to record the presence of the disease in Ceylon, and secondly to remind Canadian practitioners that unusual diseases are apt to present themselves as diagnostic problems at any time.

The author expresses his appreciation to Dr. E. P. Cawley of the Department of Dermatology, University of Michigan Hospital, Ann Arbor; to Dr. R. G. D. McNeely of the Department of Pathology, Royal Jubilee Hospital, and to Mr. G. E. Barker of the Department of Photography, St. Joseph's Hospital, Victoria for their generous assistance.

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625 Fort St.

CARCINOMA OF THE LIP SECONDARY TO CARCINOMA OF THE STOMACH

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Mrs. D.T., a white female of 38 years reported to my office April 18, 1950, stating that she had not felt well since Christmas, 1949, and that during the past 6 weeks her lower lip had become increasingly swollen and hard. She complained that bloating and belching were prominent and that during the past few months regurgitation and vomiting were frequent.

On physical examination one was immediately impressed by the thick, hard mass in the lower lip. This

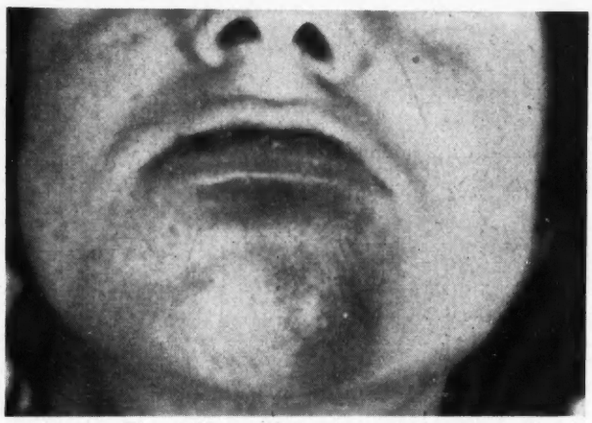

Fig. 1.—The diffuse thickening of the lower lip is seen with a thickened inflammatory ridge extending down the left side obliquely towards the symphysis menti. No ulceration is present.

mass was infiltrating a sizeable section of the full thickness of the lip near the centre and extended obliquely downwards and to the left to the symphysis menti. It was stony hard and the overlying skin was reddened to a moderate degree. There was no ulceration and no evidence of epithelial involvement. The submental, submaxillary and cervical lymph glands were not enlarged. The mass was not tender to palpation. The clinical diagnosis was secondary carcinoma.

The next point of interest was a stony hard encapsulated tumour in the axillary tail of the left breast about the size of a large olive. It was gently lobular and freely moveable in all directions; the skin was freely moveable over it. Although this tumour was stony hard its other characteristics were those of an innocent tumour. The axillary, supra- and infra-clavicular glands were negative to palpation.

The abdomen was softly protuberant and shifting dullness could be elicited. The liver margin could be palpated three fingers below the right costal margin. There were no palpable nodules in the liver. A hard nodular mass 3″ x 2″ could be felt in the left upper abdomen. This mass could be moved somewhat between the palpating hands.

X-ray examination of the chest was negative. The gastro-intestinal series revealed an apparently spastic but uniformly patent œsophagus and a small immobile stomach which did not empty readily although the pylorus appeared quite patent. The picture was sugges-

tive although not characteristic of a leather bottle stomach.

Biopsy sections of the lip, breast, stomach, and omentum revealed identical tissues in the gross. On section these specimens revealed soft, light brown, gently lobulated surfaces which were streaked with grayish white flecks. The cut surfaces did not bulge or retract. The sections all cut with a gritty sensation.

The section of lip revealed lobules of salivary gland, skeletal muscle fibres and bundles, and the interstitial tissue was infiltrated with tumour cells identical with those observed in the stomach and breast tissue. This latter finding confirms the impression that the lesion in the lip was a secondary carcinoma.

This case is reported only because of the peculiar distribution of the metastases. I have never seen clinically nor have I ever seen reported in the medical literature a case of secondary carcinoma of the lip. This was a large, hard, isolated mass without surrounding lymphatic extension or epithelial involvement, which enabled us to make the diagnosis preoperatively. It would be difficult to trace these two peripheral tumours (lip and breast) by any route except the hæmatogenous one. It is more difficult to understand why the embolic tumour cells took root in what must be a relatively sterile soil, that of the lower lip. Secondary carcinoma of the breast is not common but neither is it rare. There was nothing unusual in the intra-abdominal spread of the tumour from the stomach except that although extensive, there were no apparent metastases in the liver.

SECONDARY ABDOMINAL PREGNANCY

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Russell, Man.

Cases of ectopic pregnancy are seen from time to time in almost every doctor's practice, but instances when the gestation continues to term are by no means common. Certainly in this country there are few who can claim a wide experience of advanced secondary abdominal pregnancy. The case history which follows presents many of the features usually described. A correct diagnosis was made at an early stage but the condition was not dealt with because of the patient's refusal to undergo treatment. Later, the findings on x-ray examination were typical, as was also the occurrence of spurious labour coinciding with the death of the fetus.

In the ultimate management of the case the way in which the placenta was dealt with may be open to criticism. At the present time the consensus is that it is best not to disturb the placental attachments, especially if the fetus has only recently died, but simply to tie the cord and close the abdomen without drainage. Such treatment is generally safer than to incur the risk of uncontrollable bleeding by separating the organ from its attachments to the bowel, omentum and broad ligament, etc. However, in the case under discussion, the time that elapsed between the fetal death and operation sufficed for closing of the placental circulation to a degree that the bleeding resulting from removal of the placenta could be adequately controlled by the use of an intra-abdominal pack.

The patient was a married woman who first presented herself on October 12, 1948. She complained of continuous pain situated low in the pelvis which had commenced suddenly a few hours before. (On a former occasion she had had abdominal pain for which an operation was advised but the patient had declined treatment). Vomiting had occurred once. The last normal menstrual period had its onset nine weeks previously; since then there had been some irregular vaginal bleeding.

Vaginal examination disclosed slight enlargement of the uterus and tenderness in the left lateral fornix. The patient was admitted to hospital as a case of ectopic gestation but she went home against advice two days later.

Afterwards, she reported at intervals. A further attack of pain occurred on November 1 and again on December 7. On December 14 the fundus of the uterus was left at the level of the umbilicus but by January 4, 1949, (after twenty weeks' amenorrhœa) no fetal movements were felt and fetal heart sounds were not audible. On February 1, an x-ray film of the abdomen showed a fetus lying transversely, with the head to the left at the level of the iliac crest. By March 3, fetal heart sounds could be heard and the patient reported that movements were felt.

Subsequently, the patient was seen by three other doctors and she consulted, as well, a woman with a reputation for witchcraft who lived in an adjacent district. As a result of these consultations, she was convinced in her own mind that she did not need an operation and that her baby could be born naturally.

An attempt was made to persuade her to enter hospital on May 15 for operation but this was of no avail. She reported by telephone on May 27 when she disclosed that no fetal movements had been felt recently. By this time she was willing to accept advice that she enter hospital without delay.

Laparotomy was performed on June 1. Open ether anæsthesia was administered by Dr. D. Braunstein. When the abdomen was opened, a large dark mass presented which had the appearance of the uterus at term and which was not adherent to the parietal peritoneum. An incision into this mass was made when its wall was found to be only one-third of the thickness of the uterine wall at term; it was indeed, only a thickened membrane without any muscle tissue. The cavity thus opened contained thick amniotic fluid and a dead fetus weighing five pounds eight ounces. The fetus and the fluid were removed. It was then possible to demonstrate the placenta which was adherent to the intestines and the Fallopian tubes. The placenta was removed as well as that portion of the membrane which was free; the portion of the membrane which was adherent to the gut was left undisturbed. The uterus was slightly enlarged; the ovaries and the right tube were normal. It was evident that the ovum had ruptured through the left tube about 2.5 cm. from the cornu of the uterus. Bleeding was not excessive and was controlled by the use of several pieces of oxycel and a gauze pack in the pouch of Douglas.

This pack was left protruding through the lower part of the abdominal wound. In addition, a Penrose drain was left in the upper portion of the wound. During the operation the patient received a litre of normal saline intravenously and two ampoules of coramine. In the immediate postoperative period, 500 ml. of plasma were administered and also vitamin K.

During the first postoperative week, the temperature was elevated but did not rise higher than 101.3° F. on the third day. Penicillin, 300,000 units, was given daily and also ferrous sulphate. On the fourth day the hæmoglobin was 40% but by June 13 it had risen to 55%. The Penrose drain was removed at the end of 48 hours but the gauze pack was left until the ninth day. The patient was out of bed a week following her operation and after another week she left the hospital.

The abdominal sinus discharged for two months but when the patient was examined on September 12, the wound was well healed. It was still possible to palpate a mass of firm tissue in the abdomen. The hæmoglobin was 85%. The patient felt and looked well and wanted to know if it were safe for her to become pregnant again.

SYSTEMIC BLASTOMYCOSIS*

K. L. Drummond, M.D. and J. D. Smith, M.D.

Toronto Hospital for Tuberculosis, Weston, Ont.

Most of the cases of blastomycosis in the literature have been reported from the United States.[1] During 1948, the diagnosis was confirmed in only four cases by the Ontario Provincial Laboratories. Because systemic blastomycosis is so easily confused with tuberculosis, the following case is presented.

A 40 year old hard-rock miner of Finnish extraction complained of pain in, and swelling of, the left ankle in June, 1949. These symptoms became progressively worse and he was hospitalized in Sudbury, July 11, 1949. He was found by x-ray to have a right upper lobe lesion in his lung, and a rarefying lesion of the lower end of the left tibia. Acid-fast bacilli were reported in his sputum on smear. The patient was placed on streptomycin therapy and transferred to Toronto Hospital, Weston, on July 28, 1949. The patient appeared to be undernourished, pale and chronically ill. Temperature by mouth, 99°; pulse, 80; respirations, 20. He reported a chronic cough which had been present for years, blood-tinged sputum present for 2 months, a weight loss of 25 lb. in 4 months and a painful and swollen ankle of 2 months' duration. Breath sounds were diminished over the right apex. The chest x-ray film revealed a uniform density throughout the apical portion of the right lung.

The lower third of the left leg anteriorly was fiery red, swollen and extremely tender. The whole area was fluctuant. Brownish purulent material exuded from a pin-point sinus three inches above the ankle joint. Passive movement of the ankle joint was not restricted. Enlarged or tender glands were not present in the popliteal or inguinal regions. X-ray films (Fig. 1) revealed a large area of bone destruction in the lower end of the left tibia, destroying the cortex anteriorly and extending into the epiphysis. A small, dry, scaly lesion, 0.5 cm. in diameter, was present on the dorsum of the left hand.

Laboratory findings: Hb., 78%; white blood cells, 14,100; differential, normal; sedimentation rate, 88 mm. per hour (Westergren); urine, normal.

Two weeks after admission, the patient began to develop in rapid succession multiple cutaneous and subcutaneous lesions. These were distributed over the head, trunk and upper and lower extremities. The subcutaneous lesions became manifest as small, slightly tender, firm oval masses, which rapidly became fluctuant (24 hours). Aspiration invariably yielded 5 to 20 c.c. of sandy-brown blood-tinged pus, and resulted in persistent needle track sinuses. These sinuses gradually enlarged, becoming ulcers with a firm base, a necrotic centre and granulating heaped-up edges. The cutaneous lesions developed from small irregular areas of induration which broke down to form ulcers similar to those described above.

Two months after admission, sputum tests were reported negative on culture for *Mycobacterium tuberculosis*. Pus from the left tibia was negative for pyogenic organisms and for tubercle bacilli. Tuberculin

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Fig. 1

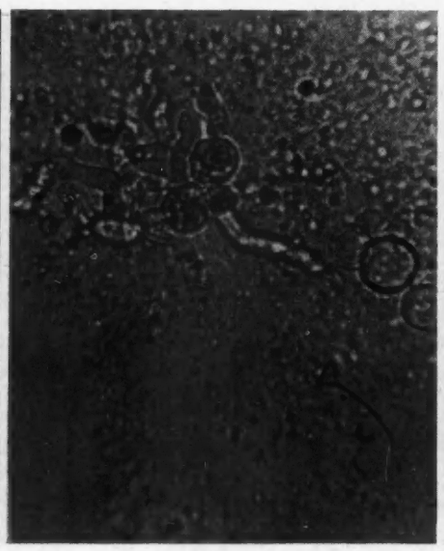

Fig. 2

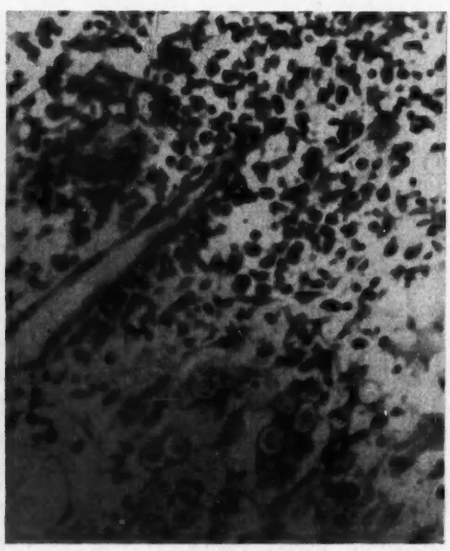

Fig. 3

Fig. 1.—Film of left ankle showing an area of bone destruction in the lower end of the tibia and extending into the epiphysis. **Fig. 2.**—Photomicrograph of pus which was digested with 10% NaOH 48 hours after collection of specimen—showing typical blastomyces, budding forms, and hyphæ. **Fig. 3.**—Photomicrograph of skin biopsy showing blastomyces in tissue.

tests were negative to one milligram of old tuberculin. A bronchoscopy showed the bronchial tree to be within normal limits.

The lower end of the tibia was incised and curetted. A biopsy was taken from several of the cutaneous lesions. Pus from the cutaneous lesions was digested with 10% NaOH and found to contain spherical bodies with a doubly refractile capsule which were similar to *Blastomyces dermatitidis*[2] (Fig. 2). Sections of bone curettings and skin lesions (Fig. 3) revealed similar spherical bodies, surrounded by a chronic inflammatory reaction.

Cultures of bronchoscopic specimens from the right lung and of pus from the bone and skin lesions grew typical *Blastomyces dermatitidis* on Sabouraud's agar, establishing a diagnosis of systemic blastomycosis. The patient was much improved by iodide therapy and transferred to a general hospital for further treatment.

SUMMARY

1. A case of systemic blastomycosis is presented exhibiting pulmonary, bone and cutaneous lesions.

2. The disease is uncommon in this locality and may be easily confused with tuberculosis.

3. *Blastomyces dermatitidis* may be easily demonstrated by examination of the sputum, pus or tissues.

We wish to thank Dr. H. S. Coulthard, Chief of our Surgical Service, for the clinical records and Mr. J. B. Fischer, Mycologist, Ontario Provincial Laboratories, for technical assistance. Permission to publish the case report was obtained through the courtesy of Dr. C. A. Wicks, Superintendent, Toronto Hospital for Tuberculosis, Weston.

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SPONTANEOUS REVERSION TO NORMAL SINUS RHYTHM IN A CASE OF AURICULAR FIBRILLATION OF LONG STANDING*

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Auricular fibrillation, once established, tends to become permanent. No reversion to normal rhythm is then to be expected. Only 2 well authenticated exceptions to this rule have been reported in the literature to date. The first was a case described by Burch in 1939[1] in which restoration of sinus rhythm occurred after a 22 months' period of auricular fibrillation. The second case, in which auricular fibrillation of 11 years' duration terminated spontaneously was described by Fogel in 1943.[2]

The following case is a third of its kind to be reported.

R.Mck., born in 1903, white male veteran was admitted to Deer Lodge Hospital on January 29, 1947, complaining of nocturnal dyspnœa of recent onset. He gave a history of exertional dyspnœa since 1943, and of semi-invalidism, due to a "withered leg", since 1944.

The patient had enjoyed good health until July 12, 1943. On the above date following strenuous exertion, he developed severe dyspnœa and weakness. He was then hospitalized for 3 months for a "heart condition" (records not available). Upon discharge from the hospital, he carried on satisfactorily, doing light work, and avoiding severe exertion.

On October 31, 1944, he sustained an embolus to his left femoral artery. This resulted in a deformed, wasted, contracted, and totally useless lower limb. He refused amputation, and settled down to a life of idleness and semi-invalidism. On January 12, 1947, he had his first attack of nocturnal dyspnœa. This recurred nightly, and made him seek admission to Deer Lodge Hospital on January 29, 1947. On admission, the significant physical findings were as follows: slight cardiac enlargement, a rumbling mitral diastolic murmur, a total irregularity of the pulse, and a Volkmann's contracture of the left lower limb. An x-ray revealed the characteristic prominence of the pulmonary arc, and left auricular enlargement of mitral stenosis. The electrocardiogram corroborated the diagnosis of auricular fibrillation.

On January 31, he began to complain of retrosternal pain which radiated laterally to the sides of the chest, and was intensified by deep inspiration. His temperature rose to 102° and there was an associated polymorphonuclear leucocytosis and elevated sedimentation rate. X-ray revealed an increase in the cardiac shadow. A diagnosis of acute pericarditis was made. After 2 remissions and exacerbations of the latter during February and March, he became afebrile and the cardiac shadow receded.

His subsequent stay in the hospital was uneventful. He became a permanent ward, and was under constant observation. Repeated physical examinations and electrocardiographic records showed, what appeared to be permanent auricular fibrillation. The illusion of permanency, however, was shattered on January 18, when at a clinical demonstration, while presenting this patient to students as a case of auricular fibrillation, I found, to my discomfiture, that the patient had reverted to normal sinus rhythm. This was confirmed by an electrocardiogram. Subsequent examinations and a repeat electrocardiogram on February 20, 1950, showed that the rhythm was still normal sinus (see Fig. 1).

DISCUSSION

Auricular fibrillation may be either permanent or paroxysmal, the latter lasting from several minutes to several days. The possibility that the described case may have been one of paroxysmal auricular fibrillation with undetected periods of reversion to normal sinus rhythm can be ruled out by the fact that the patient has been under constant observation. He was a permanent ward of the hospital, and a favorite subject for clinical demonstrations. His pulse was recorded daily, his heart examined frequently, and his electrocardiograms taken repeatedly. On the clinical evidence alone, the arrhythmia in this case can be considered to have lasted at least 37 months. Corroborative electrocardiographic evidence is available for the first 22 months.

In the case reported by Burch[1] in 1939, auricular fibrillation lasted 22 months and was

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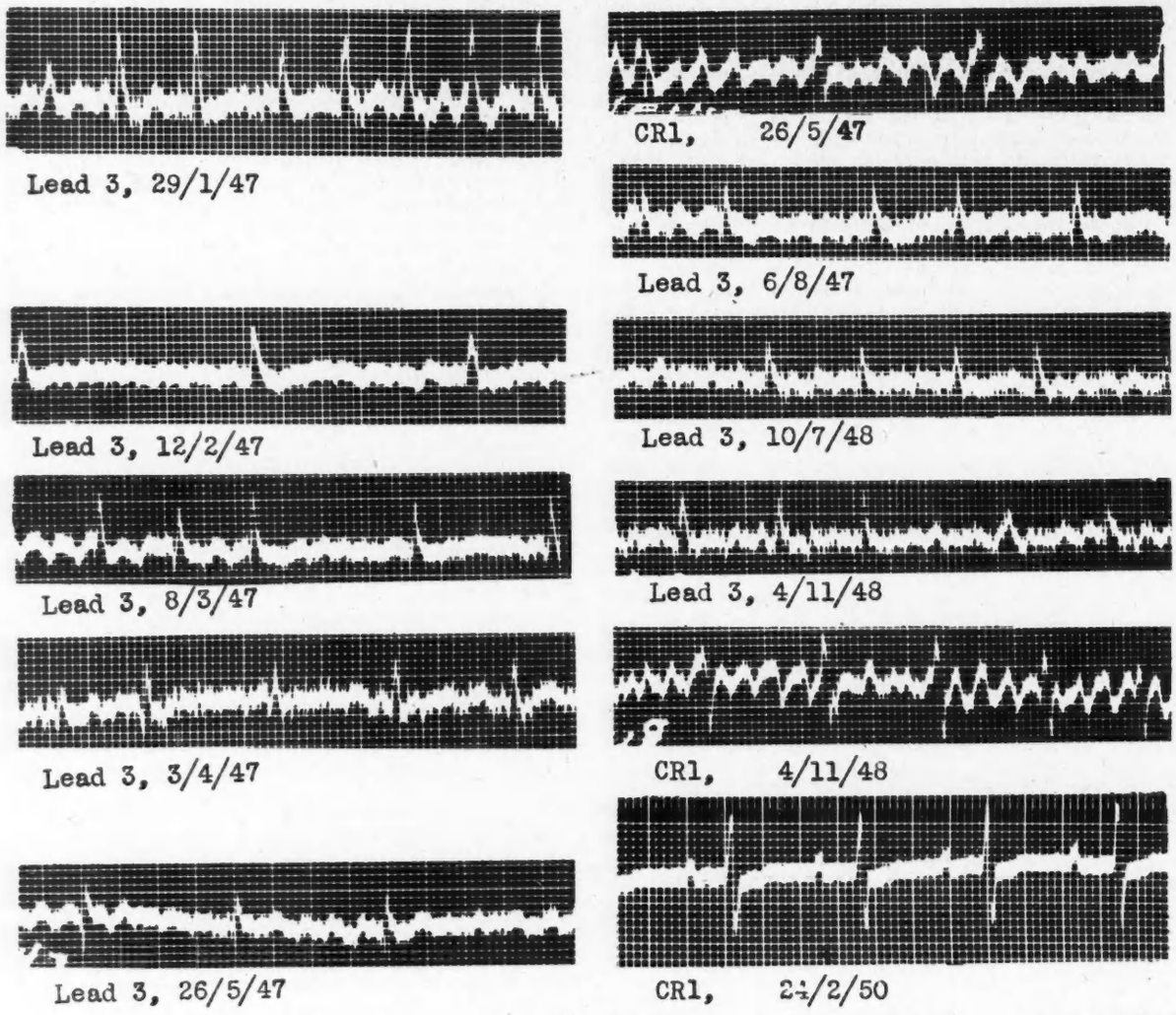

Fig. 1

replaced by sinus rhythm for a period of 4 months. After this interval of normal rhythm, the arrhythmia recurred, lasted 9 months, and was again supplanted by sinus rhythm for 4 months, at which time the case was reported. The patient described by Fogel[2] in 1943 had records of auricular fibrillation going back 5½ years, with added evidence based on the statement of the patient's personal physician, that the arrhythmia had lasted 11 years prior to restoration of normal rhythm.

The 2 previously reported cases as well as the one under discussion, had been in receipt of digitalis throughout the period of auricular fibrillation. This cannot be considered in any way related to the change of rhythm, for digitalis is known to have the tendency to perpetuate fibrillation rather than abolish it. Moreover, apart from the above physiological consideration, the fact that the drug has been started after the inception of the arrhythmia and continued throughout its duration, rules out any possible relationship of digitalis to the termination of the auricular fibrillation.

The described change in rhythm is an extremely rare occurrence, as evidenced by the fact that only 3 instances have been recorded. Yet one cannot help wondering whether the rarity is more apparent than real. It may well be that some cases pass unnoticed due to lack of continuity of observation, while others are ascribed to undetected remissions of paroxysmal auricular fibrillation. More thorough and continuous observation may perhaps bring many more similar cases to light.

SUMMARY

A case of prolonged auricular fibrillation with spontaneous restoration of normal sinus rhythm has been reported.

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INTERSTITIAL KERATITIS TREATED WITH CORTISONE

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Of the many and varied lesions of congenital syphilis in its tertiary stage interstitial keratitis is, after frank lesions of the central nervous system, the most difficult to treat, whether viewed from the immediate or the long-term result of antisyphilitic therapy. When treatment is begun early the outlook for good vision is excellent. When treatment is delayed for weeks and dense corneal opacities have formed the prognosis for good vision is correspondingly less hopeful; if the residual corneal scars are centrally placed and dense there may be little useful vision in the involved eye.

Published results of treatment have varied from very poor as reported by European workers to excellent as reported on the American continent. Herzau and Hossmann[1] found no improvement in treated cases as compared to untreated cases. Carvill and Derby[2] report useful vision in all cases, and full vision in the better eye in 75%, while Klauder and Vandoren[3] obtained excellent vision in the better eye in 55% of cases. One of the authors (A.K.G.) has seen recurrence of interstitial keratitis 15 years after what had seemed adequate and successful therapy. The quoted reports antedate the penicillin era. There seems to be general agreement that in the management of interstitial keratitis penicillin is superior to pre-penicillin types of therapy. The excellent result obtained with the use of cortisone is the reason for presenting the following case.

C.G., a 10-year old white girl, was admitted to hospital May 15, 1950. She was the third child of a syphilitic family and at the age of 8 years had been given 12 arsenical injections. On admission she showed, in addition to other classical signs of congenital syphilis, bilateral interstitial keratitis, of five weeks' duration in the right eye and one week's duration in the left eye. The right cornea showed dense opacities, the left a generalized ground-glass appearance. There was no useful vision. The spinal fluid was normal. In the opinion of the senior author the ultimate prognosis for useful vision in the right eye was poor.

Treatment was begun with 12,000,000 units of procaine penicillin in 20 daily doses of 600,000 units. On its completion both corneæ showed only moderate improvement and injection of the left sclera was still present. Although much spontaneous improvement was to be expected to continue over several months it was felt that cortisone might produce a more complete and more rapid clearing of the lesions. Accordingly cortisone was given over a period of four weeks in dosage of 100 mgm. daily, with 200 mgm. on the second, third and fourth days of the course. On the sixth day of cortisone treatment clearing of the right cornea was estimated as 70% and the inflammation of the left eye was becoming quiescent. On the ninth day the right eye had cleared to the extent that no scar was visible to naked eye examination without the aid of special illumination and in the left eye clearing was estimated at 50%. On the 14th day the right eye was completely clear to ordinary examination and only a small central scar was discernible on the left cornea.

After 28 days of cortisone treatment examination with the naked eye showed the right eye clear and the left with a tiny central scar. The patient was able to read with either eye. Slit lamp examination showed patent vessels in each eye, a barely visible deep corneal opacity in the right eye and a small corneal opacity of very slight density in the left eye. Clinically it was considered noteworthy that the right eye with the old neglected lesion cleared more completely and more rapidly than the left eye with its fresh lesion, a fact for which we have no explanation.

One month after cessation of therapy visual acuity was 6/18 in right eye and 6/60 in the left eye. According to her parents the child had always had poor vision in the left eye, but even leaving this statement out of consideration, the improvement in vision was more rapid than one would have expected with earlier forms of therapy.

There was no change in the blood Wassermann reaction with cortisone treatment (interstitial keratitis cases are frequently Wassermann fast). The patient experienced side effects of cortisone treatment to be discussed elsewhere[4] and showed a very marked improvement in general wellbeing.

SUMMARY AND CONCLUSION

1. A case is reported of a ten year old congenitally syphilitic child with severe interstitial keratitis treated with penicillin and cortisone.

2. Improvement was more rapid with penicillin and cortisone treatment than would have been expected with penicillin alone.

3. Until more data on the subject become available it would seem advisable, on the basis of the results in this one case, to use cortisone in the treatment of interstitial keratitis.

The cortisone used in this case was donated by the National Research Council of Canada as part of a grant to the Children's Memorial Hospital, Montreal.

We are indebted to Dr. B. Alexander and Dr. A. Bourne of the Ophthalmology Department for examinations of this child.

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There is virtue in the open; there is healing out of doors;
The great Physician makes his rounds along the forest floors.—(Bliss Carman.)

SPECIAL ARTICLE

GENERAL PRACTICE*

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PART I.

My remarks will come under five main headings: (1) Reasons for present general practitioner activity in Canada. (2) Definition of a general practitioner. (3) Methods of improving the calibre of general practice on a broad basis. (4) A report on what has occurred in the U.S.A. in this connection. (5) A report of what has occurred and is occurring in Canada.

As many of you already know a section of General Practice of the Canadian Medical Association was formed in Saskatoon in 1949 and our first annual meeting was held in Halifax in 1950. Many of us feel that the formation of this section was long overdue. However a word or two as to why such a move was necessary or advisable might be in order, as we frequently hear remarks to the effect that we don't need a general practitioner organization as the Canadian Medical Association already *is primarily* a general practitioner organization. This is true but it only goes part of the way. There are more general practitioner members of Canadian Medical Association than there are of all other types of medical practitioners combined. However, the general practitioners have—by and large—not taken any large part in Canadian Medical Association affairs or in provincial affairs, and despite considerable criticism among both lay and professional groups they have done very little to try to better themselves or improve the calibre of their work.

One might well ask, "Why has the general practitioner or family physician lost the standing in the profession that he held 25 to 50 years ago?" I believe this is because the general practitioners as a group have not kept up with the increased knowledge in medicine while our confrères the specialists have done so. The result of this fact is that our profession is being divided into two distinct groups.

(*a*) A super well educated well trained specialist group with prestige.

(*b*) A partly educated, partly trained general practitioner group with less and less prestige.

Not only is the profession being divided but the great service that only the general practitioner can give is being jeopardized, and it is because of this latter fact that the State is being forced to take over in various parts of the world. Another reason is that rules and regulations are made, particularly in relation to hospital work, frequently without consultation with general practitioners, often barring them from doing certain types of work within hospitals, etc., and frequently penalizing all general practitioners because of the actions or inability of one or two.

Hospital boards pass regulations stating that only those with certification or specialization may be on hospital staffs and yet in the next breath they very politely say that, "the general practitioner is the backbone of the profession" and then go ahead pushing him more and more into the background. We are not alone in feeling this discrimination keenly. In the *World Medical Association Bulletin* of January, 1950, a special committee on postgraduate medical education reported of the general practitioner that:

> "Lip service is paid to him as the backbone of medicine, and it is true that he should be. There is danger however, that he may be relegated to the position of one who sorts out patients for reference to a particular specialist. Far too few hospitals provide for integration of general practitioners with the staff of the hospital or with its work. The staffs of hospitals are organized to provide departments for the individual specialists who devote themselves in their teaching to the training of residents and assistant residents—more specialists—and who provide little of importance for the advancement of the general practitioner. The tendency should be rather to provide beds for utilization by general practitioners in the care of their patients. A division of general practice should be included in the staff of every hospital. Membership of general practitioners on various special committees of the staff would logically ensue."

The report goes on to urge that all national medical associations give these questions consideration and take appropriate action.

If you want anyone to do a good job he must be given opportunity to do good work—to improve himself and to gain some recognition of the fact that he has improved himself.

Many of us feel that medical care of the large part of the population is no better than the general practice that is done. If your general practice is good then your general medical care is good. This is particularly evident in some of the larger and older eastern cities. Medical care for a small part of the population by specialists at higher fees is excellent, but by a slow process the general practitioner has been shut out of hospitals and given no chance to achieve an esteemed position in the community. Consequently in places like Montreal and Toronto it follows that the general calibre of work done by general practitioners is deteriorating as time goes on. We feel this is bad for the larger part of the people. Admittedly this situation as yet involves mainly urban general practitioners and this frequently makes the rural general practitioner wonder what we are trying to do. However, the situation tends to keep spreading and in countries which have seen this situation developing some

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* Address delivered before the Saskatchewan Division, September 16, 1950.

time before we did, *e.g.*, in England, they now find that all general practitioners are involved and that the general practitioner does little or no medicine. He merely acts as a distributing centre and glorified clerk. Regardless of whether his lowly status is due to the National Health service or whether this act has merely accentuated his plight, the medical profession of Canada should not tolerate the beginnings of a situation in this country which would lead inevitably to the same result. The Collings' report on "General Practice in England" in the March 25 issue of the *Lancet* points out that it was a paradox that general medical care was at its worst in closest proximity to the large clinical centres.

DEFINITION OF GENERAL PRACTITIONER

There have been numerous definitions of the term general practitioner as distinguished from a specialist. Some have gone so far as to say that a general practitioner cannot be defined or classified. Actually, however, the definition is not so difficult as some would make it appear. Doctors and patients alike know that a general practitioner is a doctor who serves the family as a health counselor, as a confidant in times of sickness, and in a manner of speaking, as a specialist in the diagnosis and treatment of the general run of diseases with which mankind is afflicted. In the section of general practice we have defined a general practitioner as a man who does not confine himself to one particular field of medicine. It is generally agreed that a competent general practitioner can adequately diagnose and treat at least 85% of the ordinary diseases which cause patients to consult their doctor. Approximately 15% of the cases require further investigation and the attention of one who limits his practice to a particular disease or type of patient.

In the past few years one has frequently heard that general practitioners are a thing of the past and everyone should be a specialist. Theoretically this sounds fine, but practically it just doesn't work. Specialization as it started out some years ago was much better than it is today, because a man then did general practice for several years and gradually he became better and more interested in one particular field and took more extensive training in that field. He then became a specialist in that field and he was usually a very able man, and usually a consultant, that is, he knew a fair amount about the whole field of medicine and a lot about one particular field. However, today our specialists are trained from their internship days in one particular field and they are true specialists but not usually consultants, that is, they are trained to do one job and know very little—if anything—about the rest of medicine.

The human body is a very complex mechanism and it is well nigh impossible to confine oneself to one field and to be able to do that well without having the general background of general practice first. You may say "Well, medicine has become so extensive that a general practitioner can not keep up on everything". That is very true and is one of the hardest things about general practice. However a general practitioner must realize his limitations and in certain fields call in a specialist who is highly trained in that particular field, *e.g.*, the general practitioner should be able to diagnose a brain tumour, but he might not be able to locate it exactly and when he has diagnosed it he should call in a neurosurgeon who would do the difficult job of removing it if advisable.

There is much overlapping in most fields in medicine and many cases could be handled by either a general practitioner or a specialist. However the general practitioner usually refers the more difficult cases to the specialist. By the same token it is a considerable waste to have a man specially trained to do a particular job wasting his time doing what should be general practitioner work. Take for example the field of psychiatry. It is certainly true that most of preventive psychiatry lies, and will continue to remain in the hands of the general practitioner. This is so partly because the total number of psychiatrists even if evenly distributed throughout the country, is inadequate to care for the number of patients needing help with their emotional problems. Fully half the patients to be found in *any* doctor's office have come because of emotional problems rather than organic disease; and certainly the general practitioner is in a better position to handle most of the emotional problems than is a specialist who does not know the patient—or the family environment—and probably sees the patient in a formal office for an hour's interview. However, if the condition becomes far advanced then the patient needs special forms of treatment and should be referred to a specialist in that field. The same applies to most of the other specialties.

Hence a training in general practice for some years should be obligatory before entering most of the specialties, and by the same token it must be made possible for the general practitioner to become a specialist in a practical sort of way. Very few, for example, can leave an established practice and study for 4 to 5 years. They should be able to do part of their studying while doing general practice and I'm sure we would then have better consultants.

(*To be continued*)

THE CANADIAN MEDICAL ASSOCIATION

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EDITORIAL

THE WORLD MEDICAL ASSOCIATION

THOSE who attend medical meetings are always only a small proportion of our total number. Whilst there are good reasons for this, it still is a pity that more of our profession could not have witnessed the recent fourth annual meeting of The World Medical Association in New York.

The development of this body is a striking instance of faith in a vision, but it is still at an early stage of growth and is faced with continual struggle. Perhaps there is nothing it needs more at present than recognition of its work by the profession generally. Large organizations suffer from many inherent weaknesses, and especially from their being regarded as too much detached from practical details to be of much obvious help in everyday problems. What can the W.M.A. do that is not being done by national associations in each country? Well, the same kind of question might be asked regarding any national organization. But there can be only very few who do not realize how much the bringing together of large numbers of men with common objects generates intellectual and social forces of incalculable and otherwise unattainable extent. If one extends the idea and substitutes large numbers of countries, rather than individuals, one finds that other quite different reactions are developed. The objects of medicine are the same everywhere, but by bringing many nations together one learns the different problems which exist in carrying out that common aim. Out of these may come either a "light to guide", or an appeal. Social medicine is developing in different countries in different ways, and much may be learnt from pooling of experience. Some countries need such help in carrying on medical work that they form a claim on our interest and solicitude which cannot be foregone.

The widest view of all takes into account the fact that The World Medical Association serves as a direct agent in promoting peace, and no country can shut its eyes to any movement which helps that ideal.

The deliberations of the W.M.A. meeting will be published in its Proceedings, and we hope also to be able to republish some of the excellent papers delivered. At the moment we can only add that the success of the meeting depended almost entirely on the unremitting labours of the American Medical Association as host, to which was added the daily lavish and varied hospitality of many business organizations.

EDITORIAL COMMENTS

Hormonal Treatment of Rheumatoid Arthritis

The first report on the effects of cortisone and ACTH on rheumatic conditions appeared in April, 1949.[1] Since then, as we all know, there has been a tremendous outpouring of work on ACTH and its therapeutic effects. Perhaps our expectations were rather too high, but if so, it has not been the fault of these original investigators. In a second paper[2] they report further experiences with these hormones. But they make it quite clear that they are still seeking to find out their mechanism, rather than insisting on their therapeutic value. They say: "The use of these hormones should be considered as an investigative procedure, not a treatment". In their opinion ACTH and cortisone allow us to study the mechanism of certain diseases by new methods: "We can now repeatedly produce controlled remissions of several diseases, (with) more or less controlled relapses, both of which processes can be studied intensively by clinical, biochemical and immunologic methods."

It is too soon therefore to assess the value of these hormones. Certainly it is not yet time to assume that they can entirely replace other methods of treatment. This is emphasized by Adams and Cecil in another paper[3] dealing with rheumatoid arthritis. It was in this disease that the hormonal treatment gave such high promise, but since this has not yet been justified we must continue to use such methods as may seem worth while, such as gold therapy. Adams and Cecil point out that, while chrysotherapy has been widely used, the time factor in rheumatoid arthritis has not been sufficiently emphasized and no adequate attempt at controls has been made. Their study was devoted to a comparison of results obtained in early cases by conventional methods such as rest, salicylates, physical therapy, etc., with those obtained when chrysotherapy was added to these methods. The paper should be read in detail; it is enough to say here that it was found that gold salts, if administered in the first year of rheumatoid arthritis produced remissions of the disease sooner, and

in more cases, than in the control cases. The careful and discriminating use of chrysotherapy is still a valuable aid in the treatment of rheumatoid arthritis.

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2. *Idem*: *Arch. Int. Med.*, **85**: 545, 1950.
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Medical Audits in Hospitals

The application of commercial methods, in the form of an audit, to medical care in hospital is not new, although it can hardly be said to be widespread. A recent paper by H. G. Farish before the Ontario Medical Association* describes this type of auditing and points out its difficulties, both technically and with regard to personal reactions.

In business auditing is essential, and of course is used in the administration of the hospital. To avoid it, is to say the least, unwise. And since in principle it only means examination of what is being done there seems to be no insuperable difficulty in applying it to what is done in the treatment of the sick in hospitals. But no business in the world has so much individualism in it as has medicine. And in none other is the element of privacy so predominant. How then can we employ a system from which no secrets should be hid? Dr. Farish shows what can be done, and is being done, in some centres. He points out the advantage of, if not the necessity for, an independent physician investigator in the examination of hospital records. But a hospital staff must be unusually openminded to take a completely detached view of the investigations of an outside surveyor. On the other hand, an audit by the medical staff itself is laborious.

Medical audits, as thus described, are unlikely to become general practice. The best type of hospitals however always have a modified form of audit in their insistence on good records, on staff rounds, on clinico-pathological conferences. No doubt even these do not bring out all errors of commission and omission. But not even the most rigid audit could lay its finger on every mistake. In so far as an audit corrects, and helps to indicate, sources of error it is something well worth while. But there must first be ideals and high standards, or all else fails.

* The Importance and Value of Medical Audits in Hospitals, *Ont. Med. Review*, October, 1950.

MEN and BOOKS

HENRY BENCE JONES, A.M., M.D., F.R.S., F.R.C.P., D.C.L.*

Harold N. Segall, M.D., F.A.C.P.

Montreal, Que.

The name Bence Jones awakens in the physician's mind more or less definite memories of knowledge; "a simple test of the urine; a bone lesion, yes, multiple myeloma, rather rare; the urine becomes cloudy on heating and on further heating it becomes clear again; there is a protein in the urine, but it is not ordinary albumin".

One day in February, 1948, a middle aged woman suffering from multiple myeloma was transferred from the neurosurgical ward to my medical service at the Montreal General Hospital, and it was in preparing to officiate at a bedside clinic, with this patient as a text, that I became aware of my ignorance about the man Bence Jones. Even now, I blush again as I remember that I thought he was a physician with a special interest in biochemistry, working at the Johns Hopkins Hospital in Baltimore. A case of multiple myeloma was demonstrated to me in 1922 during a visit to this great institution where a friend of mine was working. That was the first time I learnt about Bence Jones bodies in urine. The demonstration was so vivid that I seem to have assumed that the disease was first discovered by a Bence Jones of Johns Hopkins. In preparing for the bedside clinic in 1948, I found that Bence Jones had published his observations on the urine in 1848. Here, then, was another historical landmark established in that eventful year, the year of intense political revolution in Europe, the first year in the life of the American Medical Association, and with the irreverence of Tristram Shandy, we may think of 1848 as the year in which William Osler was conceived.

I could find no complete biography of Bence Jones, but a quite long obituary notice in the *Medical Times and Gazette* of 1873,[1] several paragraphs in C. J. B. Williams' autobiography and half a page in the *Dictionary of National Biography* provide enough for a brief sketch of the man and his career.

He was born on December 31, 1813, in the home of his maternal grandfather, the Rev. Bence Bence, at Thorington Hall, Yoxford, in Suffolk County. His father, William Jones, who was of Irish descent and a colonel in the Dragoon Guards, had recently returned from the Peninsula where he had been fighting Napoleon's armies under General Wellesley, who later became the Duke of Wellington. The

* Read before the Eightieth Annual Meeting of the Canadian Medical Association, Saskatoon, Section of Historical Medicine, June 15, 1949.

baby was christened Henry Bence Jones; his brother, older by two years, had been named William Bence Jones. Thus we may underline the fact that there is no hyphen between Bence and Jones in this name, although when the name is heard it does seem to be a double barrelled surname, and in some textbooks of medicine, including Osler's, the hyphen is introduced. His parents must have called him Henry to distinguish him from his brother William, but it seems very likely that his friends and acquaintances called him Bence Jones; for it is such a pleasing, euphonious and easily remembered name. Indeed, in these days when a name is worth more than its weight in gold as an element in advertising manufactured products, Bence Jones might prove highly potent in selling anything from whiskey to works of art by an author who would adopt this nom de plume.

Henry Bence Jones's education began at private schools and was continued at Harrow and Cambridge. He distinguished himself more in athletics than in learning, but was a serious type of young man who enjoyed intimate friendship with some of the best scholars among his classmates. He preferred the study of Euclid to any other subject, and studied various arts with enthusiasm. These included music, wood and ivory carving, etching and engraving. At Cambridge he attended lectures on modern history and on geology as well as divinity lectures preparatory to taking holy orders. After obtaining an ordinary arts degree in 1836, he relinquished the idea of taking holy orders. While he was thinking of entering a business career, which would have involved emigration to New Zealand, he was influenced to make an initial step in the direction of studying medicine by becoming a pupil for 6 months of Mr. John Hammerton, apothecary at St. George's Hospital. During this half year he worked diligently from 9 a.m. to 4 p.m. to make up and dispense the medicines required in the hospital. In October, 1836, he enrolled as a regular student at St. George's. Among the extra-curricular lectures that he attended were those of Michael Faraday at the Royal Institution. C. J. B. Williams,[2] a pioneer of modern medicine and particularly of auscultation, was one of his clinical teachers at this time, and wrote of him as follows:

"He was remarkable for his hair being grey at that early age of 22, and he was not less remarkable for an earnest abruptness of manner amounting to impetuosity. He frequently availed himself of my experience in auscultation, which at that time was undergoing an ordeal at St. George's Hospital, being openly ridiculed by one physician and but imperfectly understood by others, but Bence Jones showed no great aptitude either at the bedside or at the post-mortem examinations; and it was only after private instruction in the laboratory in 1839, under Professor Graham and Mr. Fownes (of University College), that he gave evidence of so mastering his subject of study as to advance to original research."

To this estimate of one of his teachers may be added that of a contemporary student who wrote the following in 1873:[1]

"My recollections of Bence Jones extend back to about 30 years ago when we were both frequenters of the wards of St. George's Hospital—he an advanced student, I a mere beginner. He was then commencing those researches in animal chemistry by which he is so favourably known, and I can well remember his telling me with great satisfaction, as we met one day in the wards, how his first paper had been awarded a place in the Philosophical Transactions. Earnestness and energy were strong features of his character, and none could have any acquaintance with him without perceiving how genuine in him was the love of work. And this, in a day when scientific workers were not so common as they have since become; when older men were inclined to shrug their shoulders and look coldly on chemical studies in a physician. But he was no mere chemist; his laboratory never absorbed the time which belonged to the hospital. Even if he had to begin his analysis at 6 a.m., none the less he was sure to be at the hospital at 1 p.m. or thereabouts. Another marked feature of his character was the interest he took in younger men; it was not enough for him to be a worthy and successful worker himself, but he sought to make others also. No one could be more ready to encourage and aid every young aspirant than he was."

It would seem that in those days, also, it required about five years to train for the practice of medicine. Jones became a licentiate of the Royal College of Physicians in 1841, five years after he began to study at St. George's. Of course, some allowance must be made for several months lost from work in 1839 when he became ill with rheumatic fever, but his physician declared that he "recovered without any evil results immediately following". Early in 1841 he went to Giessen in Germany to study chemistry in the laboratory of Professor Justus Liebig, the founder of biochemistry. Liebig was only 37 years old at that time, but he was already the greatest authority and teacher of organic chemistry. He was a good friend of Graham and had visited University College in London in 1839. In Giessen, Jones learnt German and studied chemistry with great enthusiasm for about six months. In 1842 he took his M.A. degree and in May of that year he married his cousin, Lady Millicent Acheson, daughter of the Earl of Gosford, and "eventually had a large family, all of whom, excepting two, survived him". In October of 1842 he settled on Grosvenor Street, London, and began the practice of medicine. In 1843 his first patient was referred to him by Dr. Latham, and his second one (a nobleman) by Liebig. In the autumn of 1843 he lectured on chemistry at the Middlesex Hospital, temporarily replacing Mr. Fownes. He continued his chemical studies of urine and urinary calculi at St. George's where he became assistant physician in 1845, the same year in which he was elected a Fellow of the Royal College of Physicians. His income became increasingly larger as he gained a reputation for chemical knowledge. It is recorded that in the year from April 5, 1864 to April 5, 1865, he realized by his profits as much as £7,400. One

of his hospital students of this time, namely, about 1845, Dr. Fox of Clifton, wrote the following about Jones:

"I brought away with me a high sense of his power as a physician. His chief aim in the wards seemed to be to make therapeutics scientific. With this idea, his views at that time were necessarily chemical and he insisted on his pupils analyzing the secretions pretty constantly. His anxiety to arrive at a scientific treatment made him very unwilling to crowd several remedies together. As a student, I was impressed by the rapidity of his diagnosis. When he had fully made up his mind it was very difficult to get him to change; indeed, I often think of his advice, so useful to diffident practitioners, just entering upon the responsibilities of their profession: 'Be as long as you like in forming your opinion on a case, but when you have thoroughly formed it, stick to it'. I should say that scientific truth, accuracy and a dislike to empiricism were among his chief characteristics as a physician. His clinical lectures were clear and very full of matter; his earnestness in medical work and his high aims in it, amounted almost to an enthusiasm; and his hearty genial kindness won for him much affection from his pupils."

We can now imagine that as a popular physician, a teacher and as a research worker, his life was already quite full of activity. But he also undertook assignments that came to the good citizen who serves his community wholeheartedly. He was one of the most active workers in the establishment of the Hospital for Sick Children, the first meeting was held at his house in 1850. He assisted in the growth of the College of Chemistry. He gave time and effort to the investigation of the St. Pancras Workhouse with respect to sanitation and ventilation. In 1862 he became secretary of the Royal Institution, a position which called for considerable work in arranging the regular popular lectures on scientific subjects. In 1865 he served on the Royal Commission regarding the Cattle Plague.

His bibliography[1] includes nine books on a variety of subjects, chiefly related to chemistry, a small volume containing the three Croonian Lectures which he delivered in 1868, and forty scientific articles of which the one dealing with what we call Bence Jones bodies is the thirteenth in chronological order. It is entitled "On a New Substance Occurring in the Urine of a Patient With 'Mollities Ossium' ". It was presented on February 25 and read on April 22, 1847; it was published in the Philosophical Transactions in 1848, as well as in the Liebig Annalen of 1848.

The first paragraph of this article tells the story of how Bence Jones[3] happened to meet the problem.

"On the first of November, 1845", wrote Jones, "I received from Dr. Watson the following note with a test tube containing a thick yellow, semi-solid substance: 'This tube contains urine of a very high specific gravity; when boiled it becomes highly opake; on the addition of nitric acid it effervesces, assumes a reddish hue, becomes quite clear, but as it cools, assumes the consistence and appearance which you see; heat reliquifies it. What is it?'."

The answer to this question was given in full sixteen months later, after long and laborious studies of many specimens of urine collected from the patient during the two months that he remained alive. The patient was a male, "A grocer 47 years of age, who had been out of health for 13 months," attended by Dr. Macintyre and Dr. Watson. He died on January 2, 1846; Jones[3] attended the autopsy and observed that:

"The structure of the ribs was cut with the greatest of ease, and the bodies of the vertebræ were capable of being sliced off with the knife. The pericardium contained an ounce or two of fluid, which gave a precipitate immediately by heat and acid. The coagulum did not redissolve when heated. The fluid was feebly alkaline: specific gravity 1015.3. Heat and acid coagulated the blood, and on heating it did not redissolve. The kidneys were healthy to the naked eye, and to the microscope."

He refers to a publication by Mr. John Dalrymple,[4] "On the Microscopical Character of Mollities Ossium", in the *Dublin Quarterly Journal of Medical Science*, August, 1848, for histological observations in this case. Before gaining access to this article, I hoped it would contain a complete clinico-pathological report, but alas, Dalrymple says that Dr. Macintyre would probably report the case as a whole. But Dalrymple does state that "no suspicion of the affection of the bones existed during the life of the patient and the mollities was only revealed at the post mortem examination. As the disease does not appear to have extended to the long bones, it is not remarkable that this should have been overlooked". He studied two lumbar vertebræ and a rib, and both his illustrations and the verbal description reveal what we would now name as plasma cells which constitute the dominant element of the histological picture.

Dr. William Macintyre, the family physician, did indeed publish a full account of all his observations in the transactions of the Medico-Chirurgical Society of London in 1850.[8] All three, Macintyre, Bence Jones, and Dalrymple, were active members of this society and yet each published his share of the work on this case in a different journal at different times in the course of the years 1846 to 1850. Macintyre refers to the publications of his two confrères; his article, though it appeared last, should be read first. It reflects the thoughts of an excellent clinician and a very kind man. Macintyre merits much more credit than he has been accorded for the discovery of the so-called Bence Jones bodies. The test we now use in examining the urine was discovered by him and described in the brief note that accompanied the first specimen which Jones received. Judging by the story he tells in his report I am inclined to think that Macintyre noticed the appearance of the coagulum because he did not empty the test tube immediately after heating and dropping nitric acid into it, but returned to clean up several hours later when the yellow "coagulum", which

had not been there when he set aside the boiling urine, drew his attention. He then found that it disappeared when the urine was boiled again or if nitric acid was added to the control specimen. In this connection the following quotation is very revealing:

"But enormous as was the quantity of animal matter thus shown to have been incorporated with the urine, its presence had nearly escaped attention. . . . But, in our patient this familiar and convenient test (nitric acid) failed, like heat, to give any immediate intimation of the presence of animal matter. On the contrary, the absence of albumin was in the first trials not unnaturally inferred from the circumstance of the urine, previously hazy, becoming instantly clear on dropping the nitric acid into it; and it was only on inspecting the test tube some hours afterwards, that its contents were seen to have undergone the remarkable change already described. I was first inclined to think that some mistake had occurred, but on repeated trials with other specimens, and closely watching their course, the results were always found the same."

Moreover, it should be added that examination of urine was not performed as a routine procedure in this case, but because ". . . some amount of œdema had been observed at one period during the progress of the patient's illness".

Bence Jones describes his observations on the urine in great detail, and develops his concept of the chemical formula for the "new substance" which he names the "Hydrated deutoxide of albumin", and he writes a chemical formula for this substance. He observed what has since been confirmed, namely, that a similar substance, giving the same chemical reaction, "may be detected in small quantity in pus and in the secretion of the vesiculæ seminales". Finally he concludes:

"That this substance must again be looked for in acute cases of Mollities Ossium. The reddening of the urine on the addition of nitric acid might lead to the discovery of it; when found, the presence of chlorine in the urine, of which there was a suspicion in the above case, should be a special subject of investigation, as it may lead not only to the explanation of the formation of this substance, but to the comprehension of the nature of the disease which affects the bones."

Neither Jones nor his contemporaries considered this work as one of his major achievements. Moreover, the recognition of the relation between the Bence Jones bodies and multiple myeloma in clinical diagnosis developed very slowly. The first case to be recognized and reported on this side of the Atlantic appeared about half a century after the publication of this paper by Bence Jones. Thus, in 1898, when F. C. Shattuck of Boston was president of the American Association of Physicians, Reginald H. Fitz,[5] reported two cases of multiple myeloma with urine which showed the reactions described by Bence Jones. One of these had been examined post mortem. The second patient was alive at that time under the care of Dr. Shattuck, who found what he called albumosuria of the type described by Bence Jones, and this led him to suspect multiple tumours of the bones; "The use of roentgen rays showed such changes in the osseous structure and confirmed this opinion". As far as I have been able to determine, this was the first time that the diagnosis of multiple myeloma suggested by examination of the urine was confirmed by x-ray examination.* At this point one is tempted to examine the history of multiple myeloma to account for the slow rate at which it reached the consciousness of physicians, even the most alert diagnosticians. Thus, for example, Osler[6] first mentioned the association of Bence Jones bodies and multiple myeloma in the third edition of his textbook when he quoted the case reported by Reginald Fitz; he refers to the syndrome as Kahler's disease, named after the man who reinitiated interest in the subject. Osler had attended the meeting of the Association of Physicians at which Reginald Fitz read his paper, and promptly wrote a paragraph under the heading of "albumosuria" for the revision of his book which appeared in the same year, 1898. However interesting it might be to review the story of our knowledge of multiple myeloma, it would not be relevant to the present task which now draws to a close with the story of Bence Jones's later years before his death at the age of 59, on April 10, 1873, one day after the death of his teacher, Justus Liebig.

It will be recalled that at the age of 25, in the spring of 1839, Bence Jones suffered from rheumatic fever.

"In 1861, at the age of 47, he began to suffer palpitation of the heart;" wrote Williams in 1873, "and by the aid of a flexible stethoscope he found the signs of valvular disease, the foundation of which in all probability was laid by an attack of rheumatic fever which he had suffered 22 years before. It is well known that valvular lesions to which I first applied the terms 'obstructive' and 'regurgitant' are not uncommon sequels of acute rheumatism; but I doubt that the profession are fully aware of the fact that slight lesions of both kinds with their characteristic signs, may exist for many years without causing any marked inconvenience; until in the middle and advancing age, under the strain of bodily exertion or mental anxiety, the wear and tear of life increases them, and adding other morbid conditions of the muscular tissue, of the great secreting organs and of the blood, the disease sooner or later tends to a mortal issue.

"Most wisely, Dr. Jones resigned his office of physician at St. George's Hospital in the year following; but his ardour for science drew him into another field, which, if less laborious and more congenial, yet added to the responsibilities that were already telling on his frame. He undertook the office of Honorary Secretary to the Royal Institution . . . in 1866 we find him

* The roentgenologist was probably Walter J. Dodd,[9] the English immigrant boy, who became assistant apothecary at the Massachussetts General Hospital in 1892; because the apothecary was also the official photographer, he undertook the technical work of "X-ray photography". Thus he developed into the first radiologist of the Massachussetts General Hospital; he died a martyr to this vocation after many years of suffering, in 1917. In 1896, at the Semicentennial celebration of the discovery of ether anæsthesia some x-ray plates were exhibited: in 1897 newly designed apparatus was installed; thus in 1898, Dodd was well prepared to make satisfactory x-ray pictures of bones in a case of multiple myeloma.

dangerously ill with hydrothorax; under skilful treatment (by Dr. Bowles, Dr. H. de Mussy and Dr. Ogle) he again so far recovered that in 1867 he undertook the office of Senior Censor of the Royal College of Physicians; and in 1868 he delivered the Croonian Lectures on 'Matter and Force'. In 1870 he received from Oxford the honorary degree of D.C.L. But his work was becoming yearly more limited by increasing infirmities; and the usual sequels of prolonged heart disease—enlargement of the liver, ascites and anasarca—supervening, he succumbed on April 20, 1873.''

In 1811, two years before Henry Bence Jones was born, the very great man, Avogadro[7]—to give his full name, Lorenzo Romano Amedeo Carlo Avogadro, Count of Quaregna and Cerreta—then but 32 years old, enunciated his celebrated hypothesis: ''Equal volumes of all gases at the same temperature and pressure contain equal numbers of molecules''. This principle so co-ordinated the progressive contributions of Lavoisier, of Berzelius and of John Dalton, that it opened the gates for that luxuriant growth of chemical science whose fruits we now enjoy in such great abundance. It is the fundamental principles established by these four men, Lavoisier, Berzelius, John Dalton and Avogadro, that form the basis of today's chemical thinking and invention. Bence Jones was born just in time to be a pioneer in applying the new fruits of chemical science to clinical problems, and he made good use of his opportunity, as an investigator, as a teacher and as a practising physician.

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MEDICO-LEGAL

ADVICE ABOUT ENSURING MEDICO-LEGAL ASSISTANCE AFTER RETIREMENT

T. L. Fisher, M.D.

Canadian Medical Protective Association, Ottawa, Ont.

Recently a Canadian doctor who had been doing postgraduate work in the British Isles had a suit for malpractice brought against him under circumstances which were unnecessarily worrying.

While he was overseas he had membership with one of the British Protective Unions and when he returned to Canada he allowed his membership to lapse. That Protective Association made it a condition of assistance that a doctor must have been a member when the work was done which gave rise to the complaint, and also when the threatened action was begun. To enable the privileges of membership to be extended for the necessary time, to doctors who left the country, who retired from practice, or to their estates after doctors died, a special subscription was arranged. This special subscription the Canadian doctor failed to pay.

The suit against him was brought some time after he had left England and, therefore, under the terms of membership of the Protective Association, he was without assistance for his defence. He provided his own defence and the action against him was dismissed, a particularly fortunate happening in that his costs did not have to include any damages.

It therefore is brought to the attention of Canadian doctors going to the British Isles for postgraduate work, that they should not only take out membership in one of the British Protective Associations, but should arrange before returning home to pay the so-called compound subscription which extends their membership to cover any complaints arising out of the work they do while they are abroad.

When this case came to the attention of the Canadian Medical Protective Association it stimulated a reconsideration of the Association's own By-Laws. Previously the Association had considered that it would owe a member defence if his membership was in force when the action was done which gave rise to the complaint. Similarly, though the Association never had had to do it, it was considered that the estate of a deceased member would receive assistance should an action be brought against it. Reconsideration of the problem and legal advice about it made it seem very probable that the Canadian Medical Protective Association could not continue expecting to assist doctors who had been members, but were not at the time suit actually was instituted against them. Therefore there had to be a change in the Association's By-Laws which now state clearly that members must pay a retirement subscription to assure themselves of assistance in case of an action instituted after their retirement from practice, or to assure their estates of assistance against actions instituted after their death.

There are several hospitals in Canada, however, which pay a membership fee for their interns each year. It was felt that it would be unfair to these hospitals to demand of them more than a single year's membership fee for each intern, so an exception has been made in the case of interns, as long as their work is limited to that of an intern's duties in a recognized hospital. Should action be brought against those doctors as a result of work done while interning, even if they do not continue

membership, the privileges of membership as it relates to assistance will be theirs.

The Association thinks it is wise to publish this advice. Doctors going to the British Isles for postgraduate work should ensure the continuing benefits of membership in the British Protective Unions by paying their compound subscription before they return home, and doctors in Canada should protect themselves in their retirement and their estates after their death by paying the retirement subscription to the Canadian Medical Protective Association.

ASSOCIATION NOTES

Mid Winter Recollection of Montreal in Summer

This is Montreal as it will look when you come to the annual meeting next June.

(Courtesy of the Canadian Pacific Railway Company)

It means a trip to the top of Mount Royal to obtain this particular view. Motors are not allowed on the mountain; but, apart from this as a concession to peacefulness in the middle of a large city, it is a very pleasant experience to drive up in a carriage. One will learn more about Montreal from the cabby than is written in the guide or any other books.

Make your reservations early.

HOTELS	RATES		
	Single	*Double*	*Suite*
Mount Royal (Convention Headquarters)	$4.50 up	$7.00 D.B. up 8.00 T.B. up	$14.00 up
Windsor	5.00 up	7.00 up	15.00 up
Laurentien	3.50-$5.50	6.00-$9.50	11.00 up
Queen's	3.50 up	7.00 up	9.00 up
De LaSalle	4.00- 7.00	6.00- 8.50	9.00 up
Berkeley	4.00 up	7.00 up	11.00 up

(All above rates include bath)

MEDICAL SOCIETIES

District Meetings

District No. 8 of the Ontario Medical Association at Smiths Falls. Dr. C. K. Rowan-Legge spoke on The Meningitidies in Children. Dr. G. D. W. Cameron, deputy minister of health, spoke on Some Aspects of Medical Economics in Canada. Dr. G. W. Armstrong spoke on Low Back Pain in General Practice.

District No. 7 met at Brockville. Dr. Wallace Graham spoke on Diagnosis and Treatment of Arthritis in General Practice; Dr. M. A. Ogryzlo on The Clinical Application of Cortisone and ACTH; Dr. L. Joslyn Rogers on Medicine and Crime Detection.

District No. 3 met at Walkerton. Dr. J. H. Ebbs spoke on Pædiatrics of Interest to the General Practitioner; Dr. C. P. McCormick spoke on Head Injuries. Dr. W. J. Deadman gave the dinner address on Rudyard Kipling, Poet of Empire.

District No. 6 met at Coburg. Dr. C. P. McCormick spoke on Head Injuries; Dr. R. B. Meiklejohn on Gynæcological Problems in General Practice; Dr. Pearson Wilson on Diseases of the Rectum; and Dr. A. H. Squires on Diseases of the Thyroid.

District No. 4 held their meeting in conjunction with the Hamilton Academy of Medicine at McMaster University. Professor H. G. Thode spoke on Radioactive Isotopes and their Clinical Uses. Professor J. S. L. Browne spoke on The Effects of ACTH and Cortisone in Various Diseases. Dr. K. J. R. Wightman spoke on The Application of ACTH and Cortisone in Hæmatological Disorders. Dr. Alexander Gibson spoke on Pathological Conditions Affecting the Hip Joint in Adults. The dinner speaker was Professor William Boyd whose topic was Why Men Climb Mountains.

Dr. M. C. Harvey, Kitchener, President-Elect of the O.M.A. was a speaker at each of the District meetings.

Essex County Medical Society

The Obstetrical and Gynæcological group of the Essex County Medical Society met in October at the home of Dr. Phillip McCabe, Tecumseh. At this meeting Dr. J. H. Maus discussed some aspects of the early diagnosis of cancer of the cervix.

The Surgical fellowship group of the Society visited Royal Victoria Hospital, Montreal in October. Dr. Gavin Miller and his group presented a program of short papers with plenty of time for discussion. Later Dr. Miller entertained the group at his home.

Defence Medical Association of Canada

The regular Annual Meeting of the Defence Medical Association of Canada was held at the Chateau Laurier in Ottawa on November 3 and 4, 1950. This was preceded on November 2 by a meeting of the full Executive. Delegates from all but one of the twelve branches were in attendance.

APPLICATION FOR ACCOMMODATION

CANADIAN MEDICAL ASSOCIATION

Montreal, June 18 to 22, 1951

Mail this Form direct to:

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The Friday morning program was occupied by the transaction of some business and by addresses from representatives of the Chief of the General Staff, the Chief of the Naval Staff and the Chief of the Air Staff. Addresses were also given by Surgeon Captain A. McCallum, Chairman of the Defence Medical and Dental Services Advisory Board; by Group Captain A. A. G. Corbet, Chairman of the Inter-Service Medical Committee; and by Brigadier W. L. Coke who gave the highlights of the 5th Joint Conference of Field Medical Material on Standardization of Equipment.

On Friday afternoon an excellent program was presented. This had been prepared through the co-ordinated efforts of the National Co-ordinator of Civil Defence and the Army Medical Directorate. The following papers were given: Lieut.-Col. R. A. Klaehn, on The Effects of Mass Destruction Weapons; Major-General F. F. Worthington, on Civil Defence Organization with an Outline of Civil Defence Planning for Ottawa; Lieut.-Col. J. S. McCannel, on Casualty Estimates for a Standard Atomic Attack on Ottawa and the Basic Principles of Handling such Casualties; Col. J. N. B. Crawford, on Newer Medical Problems of Biological and Chemical Warfare.

At the Saturday morning session a new revised Constitution was adopted.

The following officers were elected for 1951: Immediate Past President—Surg.-Capt. D. R. Webster, Montreal; President—Group Capt. A. D. Kelly, Toronto; 1st Vice-president—Lieut.-Col. E. F. Ross, Halifax; 2nd Vice-president—Surg.-Cmdr. W. C. MacKenzie, Edmonton; 3rd Vice-president—Group Capt. F. A. L. Mathewson, Winnipeg; Secretary-Treasurer—Colonel J. Paul Laplante, Ste. Anne de Bellevue; Council Members—Colonel C. D. Gossage, Toronto; Colonel Alan Fraser, Victoria; Colonel Beverley Leech, Regina; Lieut.-Col. W. Mason Couper, Montreal; Lieut.-Col. Paul Martin, Montreal; Major Gordon MacKinnon, Halifax.

The following were elected as representatives of the Defence Medical Association of Canada to the 14th Meeting of the Conference of Defence Associations: Major-General C. P. Fenwick, Montreal; Colonel G. A. Winfield, Ottawa; Colonel T. E. Holland, Winnipeg; Colonel R. A. Gordon, Toronto.

J. PAUL LAPLANTE

CANADIAN ARMED FORCES

News of the Medical Services

The second meeting of the Defence Medical and Dental Services Advisory Board was held in Ottawa October 12, 1950. The main item of business was a discussion on ways and means of procuring medical and dental officers for the Armed Forces. Minutes of the meeting, at the time of this writing, are under consideration by higher authority. A further meeting of the Board will take place November 2, 1950.

Brigadier W. L. Coke, O.B.E., Director General of Medical Services of the Canadian Army, arrived back at his desk on October 19, having returned from a tour of Western Germany where he attended the manœuvres of the British Army on the Rhine (Exercises Broadside I and II).

These exercises were carried out in as realistic an atmosphere as was possible in peace time and broadly consisted of the concentration of a striking force of two divisions against an enemy who enjoyed complete air superiority. The next phase was the pursuit of an enemy attempting a strategical withdrawal of some thirty miles to a prepared river line. This river line was defended by a division on a broad front of approximately twenty miles with the pursuing enemy trying to exploit their success and cross the river before the retreating forces could consolidate. The weather as usual contributed to the realism making the going as difficult as possible but the troops took it all in good spirit.

Following these exercises Lieutenant General Sir Neil Cantlie, K.B.E., C.B., M.C., F.R.C.S., K.H.P., M.B.E., D.G.A.M.S., of the British Army, kindly arranged for Brigadier Coke to visit B.A.O.R. Headquarters Bad Oeynhausen and hospital installations at Hanover and Berlin as well as arranging a visit to the American Zone. Here Major General Denit, Chief Surgeon for the American Forces in Europe presented a most interesting program including a visit to Old Heidelberg Castle and inspection of a 700 bed hospital at Frankfurt.

The installations and barracks visited in Germany were most impressive. The morale of the Allied Forces was very high. A posting to Germany would appear to be the ultimate in the serviceman's career.

Prior to going to Germany, Brigadier Coke spent a week in England and was able to visit R.A.M.C. training installations, the R.A.M. College, Millbank Hospital, and the Dental School at Aldershot. He was able to confer with the D.G.A.M.S. Directorate at the War Office.

Although as always the tendency was to cover too much in too short a time it was a most interesting, instructive, and pleasant tour and British and American hospitality was overwhelming.

Lieut.-Col. H. M. Stephen, R.C.A.M.C., Assistant Medical Records in the Directorate of Medical Services (Army) is attending the 1950-51 postgraduate course leading to a D.P.H., at the School of Hygiene, University of Toronto. He is succeeded by Lieut.-Col. K. J. Coates, O.B.E., R.C.A.M.C., Officer Commanding Toronto Military Hospital.

Lieut.-Col. T. M. Brown, R.C.A.M.C., formerly Command Medical Officer Western Command and recently on the staff of the Directorate of Medical Services (Army), has been placed on the retired list because of ill health.

Lieut.-Col. C. D. S. Leef, O.B.E., R.C.A.M.C., Area Medical Officer Eastern Ontario Area has been posted to Toronto, Ontario, as Officer Commanding Toronto Military Hospital. He is succeeded by Lieut.-Col. W. R. I. Slack, R.C.A.M.C., Commandant The R.C.A.M.C. School Camp Borden, Ontario.

The following Medical Officers were recently appointed to commission in the Canadian Army Special Force:

Major E. H. Anderson D.S.O., 25 Canadian Field Ambulance R.C.A.M.C. Major Anderson graduated from McGill in 1938 and served in World War II from May 8, 1940 to December 13, 1945. He has been in general practice in Digby, N.S. since the war.

Major W. Fowler, Hygiene Officer, Headquarters, 25 Canadian Infantry Brigade. Major Fowler graduated from the University of Toronto in 1933 and served in World War II from September 23, 1940 to October 16, 1945. Prior to his appointment he was Assistant Health Officer, Leeds County, Brockville, Ontario.

Major R. Robitaille, Psychiatrist, 25 Canadian Reinforcement Group. Major Robitaille graduated from the University of Montreal in 1943 and served in World War II from December 1, 1943 to February 12, 1946. Prior to his appointment he was on the staff at Ste. Anne de Bellevue Hospital, Montreal.

Captain H. C. Stevenson, Medical Officer, 2nd Battalion Royal Canadian Regiment. Captain Stevenson graduated from the University of Manitoba in 1945 and served in World War II from February 20, 1945 to July 12, 1946. He has been in general practice in Minnedosa, Manitoba.

Captain Y. Dufresne, Medical Officer, 2nd Battalion Royal 22nd Regiment. Captain Dufresne graduated from the University of Laval in 1946 and has been in general practice in Squatteck, P.Q., since graduation.

Captain E. Karpetz, 25 Canadian Field Ambulance, R.C.A.M.C. Captain Karpetz graduated from the University of Manitoba in 1939 and has been in general practice in Spiritwood, Manitoba.

Group Captain A. A. G. Corbet, R.C.A.F., has returned from a three months' tour of the United Kingdom and Europe. The initial part of the tour included a detailed study of facilities of the R.A.F. Medical Service in all its aspects. This was arranged through Air Marshall Sir Philip C. Livingston, K.B.E., C.B., A.F.C., F.R.C.S., K.H.S., Director-General of Medical Services, R.A.F. This included visits to the R.A.F. units in Western Germany. While in Germany special arrangements were made, through the courtesy of the Air Surgeon, to visit all the U.S.A.F. units and medical installations.

Service and civilian Aero Medical Laboratories were also visited in Holland, Belgium and France. Particularly interesting was the demonstration in Holland of the Mobile Blood Laboratory which, in a self-contained unit, processes blood from the donor to the dried serum and other end products. Throughout the visit detailed studies were made of the interesting research projects in aviation medicine and the physiology of flight and also on all aspects of air evacuation.

The fourth Civil Medical Examiners' course was held during October at the Institute of aviation Medicine, Toronto. These courses are given under the guidance of Dr. H. E. Wilson, Chief, Civil Aviation Medicine, Department of Transport, in co-operation with the R.C.A.F. Several Air Force Medical Officers lecture to the Medical Examiners during each course.

The R.C.A.F. co-operated with the Department of National Health and Welfare during the summer and early fall by making arrangements to have one of their Medical Officers, Flight Lieutenant J. R. W. Wynne and one of their Nursing Sisters, Flying Officer P. Brown, accompany the medical survey team aboard the *C. D. Howe*. This team provided medical and dental services to Eskimos in the Eastern Arctic ports of call and included an x-ray unit.

The twelfth meeting of the Advisory Medical Committee was held on September 30 and October 1, 1950 in Toronto. At this meeting announcements were made regarding the promotion to the rank of Group Captain in the R.C.A.F. Reserve, of the following Consultants: Group Captains G. L. Adamson, A. W. Farmer, M.B.E., W. R. Franks, O.B.E., J. F. McCreary, J. C. McCulloch, A. H. Sellers, A. C. Singleton, M.B.E., J. A. Sullivan, D. R. Wilson.

CORRESPONDENCE

Atomic Bombing

To the Editor:

In *The Canadian Medical Association Journal* of June, 1950, Colonel J. N. B. Crawford, R.C.A.M.C., in his paper "Medical Aspects of the Effects of Atomic Explosion" has summarized the present available knowledge on this subject. The standard effects of the atomic bomb have been described under three headings, (1) blast injuries, (2) thermal injuries, (3) radiation injuries.

It is suggested that there is a 4th effect of the atomic bomb which is very important and that is a psychological one—the production of widespread fear. Part of this fear is the result of the knowledge that the damage from the atomic bomb is much more extensive than from ordinary high explosive bombs. A large part of this fear, however, is the result of a suspicion in the mind of the average person that there are delayed effects or effects which may cause inherited conditions, as typified by the remark "a population subjected to atomic bombing will turn into a race of monkeys".

I visited Hiroshima during the month of September, 1950, five years after the end of the war. Hiroshima still reveals results of damage done by the atomic bomb. It is well, however, to recall that similar scars can be seen in many cities in Europe as a result of destruction by ordinary high explosive bombs. Members of the Atomic Bomb Casualty Commission, with scientific diligence, are continuing to collect all available information with regard to any possible latent medical effects of atomic bombing. Up to the present time the findings which have been published have described only one such effect and that is the occasional development of cataract. Ten cases of cataract* which are believed to have been caused by radiation from atom bombs have been reported in the medical literature. It is theoretically possible that changes might be found in the second generation as a result of radiation injury and observations for a period of twenty-five years may be necessary in order to give an exact scientific opinion on this problem. Up to the present, however, no evidence has been published to indicate the occurrence of any transmitted or inherited variation among human beings.

At the time of their introduction, all new weapons of war tend to produce a terrifying effect. The military value of submarines, poison gas, aerial bombardments and "buzz" bombs was enhanced by the fear which attended their introduction but each in turn brought forth countermeasures to neutralize or minimize its effects. Without in any way underestimating the drastic effects of bombing with atomic missiles, it should be kept in mind that certain defined and effective steps can be taken to reduce the disastrous results of such an attack.

The widespread terror which was associated with the threat of mass bombing probably was a factor in producing the hesitancy which characterized the foreign policy of certain countries in the years immediately preceding the outbreak of the Second World War. It should be the duty of the medical profession to inform the public of the present available knowledge on the medical effects of atom bombs in order that the approach to any future threat of international aggression may be governed by the realities of the situation and not influenced by the fear of a weapon, the results of which are undetermined or exaggerated.

C. W. MACCHARLES
San Francisco,
California.

The General Practitioner and the Hospital

To the Editor:

An excellent letter by Dr. J. H. MacDermot in the September issue of the Journal and your invitation to contribute on the subject of General Practice prompt me to offer some further comments.

First I wish to agree wholeheartedly with all that Dr. MacDermot stated in his letter. I will not labour any of the points raised, rather, I would like to concentrate on the *modus operandi*.

A consideration of the most vital issue, that of extending the facilities of all general hospitals to the General Practitioners, at once raises the question of controls or "safeguards". Hospital staffs and administrations are not likely to be sold on the idea of accepting the G.P.s and "letting them loose", so to speak. One can visualize memoranda specifying exactly what procedures the G.P. may attempt and precisely where he must bow out. Perhaps a separate file may be drawn up for each G.P.! I would like to submit that such an approach is ineffective and wrong. Medical practice is too complex to be susceptible to such an analysis on paper. And surely no one will argue that such "safeguards" give any guarantee of *good* practice. Any operation performed correctly by precisely the right man may still have been a serious blunder. What of the so-called "minor" procedures which the G.P. is admittedly able to handle? Are these not susceptible to gross mismanagement? But why single out the G.P.? Has he a monopoly on incompetence and dishonesty?

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* Cogan, D. G., Martin, S. F. and Kimura, S. J.: Atom Bomb Cataracts, *Science*, p. 654, December 16, 1949.

I do not presume to know the complete answer to this problem. I do feel that the draft hospital constitution as contained in "Hospital Administration and Management" by T. M. MacEachern offers a good deal of hope for a solution. In essence it states that there shall be a meeting of the staff at least once a month and that this meeting must concern itself largely with a discussion of complications, mistakes in diagnosis, deaths, etc. It is therefore an "audit" concerned mainly with the "debit" side of the work of the staff. The influence of such a program, directed honestly and fearlessly by the appropiate committee, is immediate and profound. An honest practitioner is not afraid to present his mistakes and difficulties for examination and discussion by his colleagues. Everyone can learn from these and benefit by them. On the other hand, incompetence and dishonesty become readily obvious to all, even though the cases are taken up in a routine fashion. Naturally, discussion must never be allowed to degenerate to a personal level.

Under such a regimen every member of the staff, specialist or G.P. knows that he may be called upon to discuss and justify any course of action he takes. As a result nothing is undertaken lightly. Cases are investigated more thoroughly and consultations are more frequently requested. All this contributes materially to a higher level of medical and surgical practice and acts as the only "safeguard" worthy of consideration by an enlightened profession.

M. M. SEREDA
9914-109 St.,
Edmonton, Alberta.

Folic Acid in Acute Leukæmia

To the Editor:

In the September, 1950 issue, Dr. D. L. McNeil recorded the cases of 3 acute patients obviously unresponsive to folic acid-antagonist administration. I have gone over the reports carefully and gathered the impression that penicillin was the only antibiotic administered. Dr. McNeil mentions, non-committally, that some authorities regard the disease as a form of "cancer". His report seems to be a factual presentation of "antifol" failure in acute leukæmia.

I am led to comment on the report because it does not suffice, as seems to have been the situation to date, for hæmatologists to make private, but not published comment on the fatuity of antifol therapy. The fault may not be entirely with the hæmatologists concerned because medical editors are reluctant to accept negative-result reports, as I can well testify. The situation is a particularly difficult one with regard to therapies applied to acute leukæmia, since the desire is for statistical studies. Statistics in this instance may attain significance only at the expense of human beings deprived of a reasonable chance for spontaneous or induced remission. For acute leukæmia, which appears to be more closely allied to the "atopic" or "rheumatoid" diseases, than to the propagative, dedifferentiated neoplasms that we term "cancer", does have pronounced remissive tendencies not seen in the classic "malignancies".

For these reasons I have never used a myelosuppressive agent (in which class the antifols must be incorporated) in the treatment of the acute leukæmic patient, and I am therefore unable to render the contribution of statistical demonstration of futility. This does not mean that I have not had access to the observation of antifol-treated patients (*Modern Medicine*, Corr., July 15, 1950). My impressions are distinctly in accord with Dr. McNeil's observations and at complete variance with another recent report (Dameshek *et al.*, *Blood*, October, 1950) in which it is insisted that the antifols still afforded the major highway for assault against the disease. In the last report, it is mentioned that penicillin "and other antibiotics" had been used when indicated. I presume that this means that antibiotics were used during the relapsant phase, that in which the antifols are supposed to work; and by "other antibiotics", I assume that the authors refer to the streptomyces derived ones; terramycin, aureomycin, chloramphenicol and streptomycin, the coliform-aerogenes suppressors, the majority of which are usually administered orally. Penicillin is usually administered parenterally.

Coliform suppressor antibiotics, when given orally, will frequently produce rapid clinical and hæmatologic remission in acute leukæmic patients, at least when there is an attendant change of the Gram-negative bacillary stool flora, to a Gram-positive, saccharolytic one (*Ohio State M. J.*, **46**: 784, 1950). Considering the implied contradiction between Dr. McNeil's impressions of the value of antifol therapy and those reported by Dr. Dameshek *et al.*, I was stimulated by the chance thought that the latter investigators had been using copious, oral, streptomyces-derived, antibiotic therapy and that their high remission rate might be due to the latter factor, not to the antifol and possibly in spite of it. I therefore re-examined the data from a large federal hospital in the vicinity, wherefrom had emanated one of the initial glowing reports on the merit of antifol therapy in acute leukæmia (a report later qualified and retracted in private conversations but not in a published document). I was not surprised to find that it had been in those patients where intensive oral antibiotic therapy (chloramphenicol and aureomycin) had been used conjointly with aminopterin, that the patients had benefited.

With regard to the hopefulness of the antifol approach in general, about which Dr. McNeil, though stating his awareness of its proposal, remains whimsically non-committal, I would like to mention the continuing studies on my own series. I have now four, one-year survivals among acute leukæmic patients in whom a predominantly saccharolytic intestinal flora and odourless stool, is being maintained by the continued daily administration of streptomyces derived "animal protein factor" and the streptomyces-rimosus derived antibiotic, terramycin. The cases require careful regulation of dosage in this regard, as well as constant supervision, because the emergence of resistant coli-aerogenes strains is frequently attended by relapse. Despite the difficulties of this type of maintenance, I already have a better remission and survival rate than any "antifol" series published to date. My statistics in this regard would be even more convincing had I earlier recognized the propensity of acute leukæmic patients to react like "rheumatoids", to retain sodium and water and even to go into fatal congestive heart failure (as they frequently do on adreno-corticotherapy, also) when given streptomyces-derived antibiotics over a long period of time. But the approach may be a more promising one than the antifols have proved to be in the experience of Dr. McNeil, whom I wish to thank for a splendid scientific report.

ROBERT D. BARNARD
Clinical Hæmatologist.

Terrace Heights Hospital,
Hollis, L.I., N.Y.

SPECIAL CORRESPONDENCE

The London Letter

(From our own correspondent)

DISTINCTION AWARDS

Considerable controversy has always centred on what have come to be known as "distinction awards" for specialists. The salary scale for whole-time specialists runs from a salary of £1,700 per annum at the age of 32 to £2,750 per annum at the age of 40. This means that for the remaining twenty-five years of his service a specialist can look forward to no increased remuneration. It was to overcome this stultifying position that the Government accepted a recommendation that special "awards" should be made to a proportion of specialists, these to be known as "distinction awards". One-third of the specialists in the National Health Service are

entitled to these awards. As there are now 5,200 specialists in England and Wales, this means that 1,700 are due to receive such awards. Of these, 200 will receive an addition of £2,500 per annum to their salary, 500 will receive an additional £1,500 per annum, whilst 1,000 will receive £500 per annum extra. These figures apply to whole-time specialists; part-time specialists will be paid on a *pro rata* basis, depending upon the amount of time they are giving to the Service.

The selection of specialists to receive these awards has been in the hands of an "awards committee" under the chairmanship of Lord Moran. It has just been announced that this committee has selected 1,500 specialists for these awards. Their names are not to be published. The wisdom of this decision not to make public the names is being questioned, particularly in view of the controversy that has centred on the whole problem of distinction awards. It was certainly an invidious task selecting the chosen, and it is inevitable that mistakes, both of commission and of omission, should be made. On the other hand, it is difficult to think of any other plan for rewarding merit that would have been easier or fairer. There is general agreement with *The Lancet* that the scheme must be given a fair trial, although the same journal's remark that "with surtax at its present level, the experiment costs the nation little" may not be appreciated to the full by the eminent 1,500 specialists who have now been notified privately of their success in the "distinction stakes".

The Chronic Sick Child

The speed with which those at present in authority insist upon carrying through their grandiose schemes for the initiation of the welfare state is leading to many administrative tangles. One of these is the care of the handicapped child, for which three separate Government departments are responsible—the Home office and the Ministries of Health and Education. In addition, local authorities are involved. This is particularly unfortunate as the facilities provided for certain categories of children are eminently satisfactory, though often inadequate for the number involved. Thus, for instance, last year there were 8,000 crippled children in the country, of whom 4,800 were in day special schools, and 1,200 in residential schools, leaving 2,000 unplaced. In England and Wales there are now 74 special schools for physically handicapped children, of which 48 are day schools and 26 are residential. In addition, home teaching is being provided for over 1,000 children. It is the child with multiple handicaps who is most difficult to fit into the present scheme of things, and for whom home education is advisable. The extra cost of an invalid child at home, however, is a considerable item in the domestic budget, and at the moment no financial help is available for this purpose, apart from the provision of education at home.

Obviously, what is required is some means of co-ordinating the various bodies concerned with the welfare of the chronic sick child, including both statutory authorities and voluntary bodies. The general standards for the care of such children are good; with a little more thought and initiative it should not be difficult to evolve a scheme which would ensure that these unfortunate children will receive the care and attention to which they are entitled.

Premature Baby Unit

London now possesses three premature baby units, a new one having just been opened at University College Hospital. This consists of two nurseries, each with six cots, and an isolation unit with two cots. The staff consists of the physician-in-charge, a sister-in-charge, five day nurses and three night nurses. About one in every sixteen babies born in this hospital is premature, but in addition the Unit will take in premature babies born outside the hospital, *i.e.*, babies weighing less than 5 lb. who are in need of special care which cannot be provided at home. A member of the staff of the Unit will collect the baby by ambulance from anywhere in the London area. A specially constructed cot, with an oxygen cylinder, is used for the transport of these babies from outside the hospital, as by this means no special attention need be given to the atmosphere of the ambulance. The Unit includes a breast-milk bank where the milk is stored in the frozen state.

The Wellcome Library

The library of the Royal Society of Medicine is recognized to be the best medical library in this country. Its outstanding success has been a source of embarrassment to the Council of the Society for several years, as its rapid expansion and its increasing popularity have involved steadily increasing expenditure. To meet these increased demands, and yet maintain the high standards of service which everyone has come to expect from it, was becoming increasingly difficult from the financial point of view. Much of this problem has now been solved by a gift of £80,000 from the Wellcome Foundation which has been made to the Society "for the purpose of establishing within the Society a medical research library bearing the name of Wellcome which shall be effectively part of the library of the Society". This generous gift means that expansion and efficiency can now be kept in step, and an already famous library can now look forward to a further long period of outstanding service to the medical profession of this country.

WILLIAM A. R. THOMSON

London, November, 1950.

ABSTRACTS FROM CURRENT LITERATURE

Medicine

Cough as a Symptom of Cardiovascular Disease. Currens, J. H. and White, P. D.: *Ann. Int. Med.*, **30:** 528, 1949.

Cough, especially if nonproductive and not accompanied by hoarseness, fever or chest pain, is so common that it often attracts but little attention. As a symptom of cardiovascular disease, cough is frequently neglected in contrast to the more impressive symptoms of dyspnœa and chest or arm pain. During the past thirty years sporadic reports, mostly European, have appeared with reference to cough as a symptom of heart disease. Textbooks on heart disease mention cough as a possible symptom of mitral stenosis, cardiac failure or aortic aneurysm but few reports consider cough a significant symptom of cardiovascular disease. The authors contend that cough is an early symptom of various types of cardiovascular disease and with careful evaluation of the history in each case, the importance of the symptom can be recognized because of its prompt subsidence following adequate therapy.

The authors' series of representative types of heart disease in which cough was a prominent symptom include cases of rheumatic heart disease with mitral stenosis, hypertensive and coronary heart disease, cardiovascular syphilis, pericardial disease, congenital cardiovascular disease, auricular fibrillation and cardiac neurosis. Pulmonary congestion, due to left ventricular failure or mitral stenosis, is the most common cause of cough. The cough may be noticed only after exercise or it may be chronic and especially troublesome at night. It is frequently associated with congestive heart failure and is often a precursor of paroxysmal dyspnœa, during which it may be a prominent and aggravating symptom. The amount and character of the sputum depends on the degree of congestion. Morphine and its derivatives reduce the sensitivity of the vital nerve centres of the brain to the stimuli arising in the pulmonary parenchyma and are effective in controlling both the cough and dyspnœa. Certain disorders of the cardiovascular system, like aortic aneurysm, produce cough by direct pressure upon the trachea or bronchi. The cough in these cases is brassy in character, is seldom productive and is usually associated with hoarseness. Surgical treatment of

the aneurysm by cellophane wrapping may prove of definite value in certain cases. A vascular ring, due to a congenital right aortic arch and associated anomalies, may press directly on the trachea and produce irritation and stenosis. This condition should always be considered in infants or children who have recurrent cough and pulmonary infection. The surgical treatment of vascular rings is so satisfactory that it is important to recognize them early before irreparable damage may be done to the bronchi and lungs. J. F. SIMPSON

The Pneumonia of Measles. Weinstein, L. and Franklin, W.: *Am. J. M. Sc.*, **217:** 314, 1949.

Bronchopneumonia is one of the three serious bacterial complications of this common viral disease. Due to inadequate reporting and selection of cases and questionable criteria in diagnosis, it is difficult to obtain accurate information concerning this complication. The purpose of this investigation was to study the clinical course of the bronchopneumonia, to establish definite criteria for its diagnosis, to determine the bacterial agents involved and to examine the effect of penicillin treatment. There were 41 cases of "proved" pneumonia in 163 instances of measles (25%). The great majority of the pneumonias occurred in children five years of age or under and there were none in the group ten or more years old. Predisposing factors were underlying disease and a history of frequent severe respiratory infections.

In approximately half of the patients that developed pneumonia, the infection occurred early in the eruptive stage and in the remainder was almost equally divided between the pre-eruptive and the fading period. The most common physical findings were râles, altered breath sounds, dullness to percussion and dyspnœa. The degree of pyrexia at the onset of the pneumonia was of little diagnostic value but a secondary rise in temperature was more significant. Radiologically, in almost 50% of cases, the only abnormality noted was hilar and peribronchial infiltration. Similar alterations are often observed in uncomplicated measles. Patchy infiltration (16%), generalized mottling (10%), and/or localized densities (29%) were of greater help in establishing the likelihood of pneumonia. The white blood cell count in rubeola is normal or moderately decreased but is increased in bacterial pneumonia. A single estimation was of little value but repeated determinations were helpful. The commonest bacteria recovered from the upper respiratory tract were non-pathogenic streptococci. Hæmolytic streptococci aureus and hæmophilus influenzæ were each found in about 25% of the cases of pneumonia and undoubtedly were important etiological factors.

Due to the high fatality rate of untreated pneumonia, penicillin was administered to all patients as soon as pneumonia was suspected and continued until the temperature had been normal for 5 days. Eighty per cent of the children were afebrile after 72 hours and all were afebrile by the sixth day. Complications of pneumonia occurred in five patients: bacteræmia (2), pleural effusion (2) and pericardial effusion (1). There were no deaths in the entire group of complicated or uncomplicated pneumonias. J. F. SIMPSON

Clinically the Myocardium. Christian, H. A.: *Arch. Int. Med.*, **86:** 491, 1950.

This is an earnest and brilliant plea to restore to the myocardium the importance allowed it before it was to some extent pushed into the background by other "approaches" to disease of the circulatory system. Dr. Christian feels that very frequently, indeed, defective functioning of the myocardium and not vascular impairment or peripheral involvement is the chief cause of deterioration.

He suggests that acute infectious diseases are the initial cause of many diseased myocardia. Acute rheumatic fever, of course, is the first to be thought of—although in many cases there is no permanent damage from the myocarditis of an acute illness. In many others there is not complete healing but instead a progressive deterioration. Later autopsy shows focal or diffuse lesions of the myocardium; again an acute infectious condition may be responsible for the onset of decompensation in a chronic case doing moderately well.

In the later decades of life chronic non-vascular heart disease increases markedly in proportion to the chronic valvular group. The author discusses the pathological changes in hypertrophy which make nutrition of the heart muscle difficult. Arrhythmias, he thinks, are an expression of irritability or reaction to myocardial changes. The vulnerability of the heart muscle to damage from any toxæmia, is emphasized.
P. M. MACDONNELL

The Failure of Antihistaminic Drugs to Prevent or Cure the Common Cold and Undifferentiated Respiratory Diseases. Feller, A. E., Badger, G. F., Hodges, R. G., Jordan, W. S., Rammelkamp, C. H. and Dingle, J. H.: *New England J. Med.*, **242:** 737, 1950.

This publication records a rather remarkable study carried out by the Department of Preventive Medicine, Western Reserve University, on family groups, which they have had under close observation, and on medical students who volunteered for inoculation with the virus of the common cold. In neither group could the antihistaminic drugs be shown to have any value in the prophylaxis or treatment of respiratory illness.
NORMAN S. SKINNER

Surgery

Cystic Disease of the Lung. Stroud, J. E.: *J. Thoracic Surg.*, **18:** 404, 1949.

Pulmonary cystic disease simulates many other common pulmonary diseases and even in the most competent hands the lesion frequently remains unrecognized. This is due largely to the apparent infrequency of the disease and the clinicians' corresponding lack of acuity in bearing the possibility in mind. The correct diagnosis is particularly desirable because surgical treatment, in most instances, produces gratifying results and is a life-saving measure in some of the more acute cases.

There has been considerable confusion regarding many aspects of cystic disease and the author, in presenting six cases, has adopted a simple but adequate definition and classification. The term "pulmonary cyst" includes all pulmonary abnormalities, regardless of their pathogenesis, in which cyst or cyst-like structures of the lung or bronchi are found. Specific entities, such as tuberculous or carcinomatous cavities, pulmonary abscess and parasitic and mediastinal cysts are excluded. Small and uncomplicated cysts are probably asymptomatic and are diagnosed accidentally by roentgenogram. The symptoms of cystic disease are due to the complications that may arise. (1) An infected cyst produces symptoms of recurring pneumonia, chronic bronchiectasis or pulmonary abscess. (2) Hæmorrhage occurs when a blood vessel is eroded and varies from blood tinged sputum to severe hæmoptysis. (3) An enlarging cyst causes collapse of the associated lung and mediastinal shift with resultant dyspnoea and cyanosis. (4) Rupture of the cyst wall effects tension pneumothorax or empyema.

As the signs and symptoms of pulmonary cystic disease are not characteristic and chest roentgenography is frequently misleading, the diagnosis may be impossible without surgical intervention. The most common diagnostic error made is pulmonary tuberculosis but lung abscess, bronchiectasis, spontaneous pneumothorax, empyema, carcinoma of the lung and mediastinal tumour are also usually considered. One's suspicions should be aroused in: (*a*) a young patient with dyspnœa and cyanosis and without a cardiac lesion, (*b*) a patient of any age with a spontaneous pneumothorax, (*c*) a patient with hæmoptysis, persistently negative sputum and an atypical roentgenogram, (*d*) a patient with empyema and an atypical history of previous pneumonia, (*e*) a patient whose roentgenogram shows an absence of the usual pulmonary and pleural reaction around any suspected inflammatory lesion and (*f*) a patient with an adequately drained lung abscess or empyema but who is not doing well. J. F. SIMPSON

The Surgical Treatment of Diverticulitis of the Colon. Boyden, A. M.: *Ann. Surg.*, **132:** 94, 1950.

A bold attack on diverticulitis which is complicated by perforation, obstruction, recurrence, fistula, or difficulty in differentiation from carcinoma, is advocated in a review of 38 cases. It has been shown that measures short of resection yield exceedingly poor results and that many patients so treated wear permanent colostomies. The majority of the 32 cases resected were operated upon promptly; 25 had primary resections and 7 had a preliminary colostomy for an average of 4 weeks. In many cases transverse colostomy is unnecessary but it is obviously required when complete obstruction complicates the disease. Cæcostomy seems unwise. The type of anastomosis, aseptic or open, seems of little consequence if the bowel is properly prepared and there is a wide stoma. If the integrity of the suture line is in doubt, complete sidetracking of the fæcal stream is better.

With resection, the morbidity and mortality of complicated diverticulitis is greatly lessened. BURNS PLEWES

Obstetrics and Gynæcology

Diagnostic Culdoscopy. Teton, J. B.: *Am. J. Obst. & Gynec.*, **60:** 665, 1950.

Culdoscopy is a procedure for the visualization of the pelvic organs by means of an optical instrument introduced through the posterior fornix. The patient is placed in the knee chest position. Five ml. of a 1% procaine solution is injected into the posterior fornix. General anæsthesia, spinal or caudal anæsthesia may be used also. One hundred mgm. demerol intravenously is satisfactory premedication. The ovaries and the posterior surface of the uterus come into view very rapidly. The complete visualization of the normal tubes is not always as readily demonstrated. The cervix can be manipulated to bring the anterior surface of the uterus into view and if the bladder is partially distended, it can be seen.

The author's experience with the culdoscope in 96 cases has convinced him that this procedure is an asset in the study of many pelvic disorders. The information gained in most instances was so detailed and clear concerning the pelvic structures that such knowledge was not obtainable by other means except laparotomy. The only contraindication is a fixed mass in the cul-de-sac. The author feels that culdoscopy is a safe and valuable procedure. ROSS MITCHELL

Postpartum Blood Loss: An Analysis of 6,000 Cases. Vant, J. R.: *Am. J. Obst. & Gynec.*, **60:** 483, 1950.

This is a review of a previous series in which the measured blood loss during delivery averaged 323 c.c., with 314 cases (15.4%) in which it measured 600 c.c. or more, also a review of a present series (4,204 cases) in which the measured blood loss averaged 219 c.c., with 180 cases (4.3%) in which it measured 600 c.c. or more. A comparison is made of the duration of the third stage in relation to blood loss of the two series, showing a greater number in the present series with shorter duration and consequently less blood loss. There is a brief note on the reasons for the decreased length of the third stage and decreased blood loss, *i.e.*, supervision of antenatal weight gain, attention to the patient's blood picture, pelvic capacity estimation, more active management of the third stage, and a change in intrapartum sedation. ROSS MITCHELL

Dermatology

Pathogenesis of Urticaria. Graham, D. T. and Wolf, S.: *J. A. M. A.*, **143:** 1396, 1950.

The authors' study concerned itself with 30 sufferers from chronic urticaria. They apparently accept the view of previous investigators that urticaria represents an allergic reaction to acetylcholine released at nerve endings during vasodilatation due to such causes as raised temperature, exercise or "emotion". While various other sources of allergic reaction such as ingesta were noted, the patients (17 women and 13 men) were subjected to intensive investigation of their life history, with particular reference to an understanding of the emotional setting attending the first and subsequent urticarial attacks. Skin temperature and reaction hyperæmia were employed as measures of cutaneous vascular function, since they reflect the activity of the arterioles and minute vessels (capillaries and venules) respectively. It was considered that a dilated capillary is a more permeable one; skin temperature is an indicator of the calibre of the arterioles, and the state of the minute vessels was assessed by the reactive hyperæmic threshold—a test of tonus, determined by the length of time required to produce a complete ring of hyperæmia without spread to adjoining skin upon which compression was exerted by a standard weight. Skin temperature was raised and minute vessel tone was decreased in all patients in whom resentment was the chief emotion brought out by discussion of topics of significant personal concern. In patients in whom dejection and hopelessness were the predominant feelings there was a loss of minute vessel tone but a lowered skin temperature, probably indicating arterial constriction. The essential difficulty in the cases showing resentment was increased tendency of both arterioles and minute vessels to dilatation. With this appeared the increased transudation of fluid. In all the cases studied there was an interesting failure to find "allergic" factors. A careful distinction was drawn between feelings of hostility and feelings of resentment, which are distinct. The vascular reactions of chronic urticaria were concluded to be the result of extreme dilatation of both arterioles and small vessels, which are the same as those occurring after actual trauma to the skin as produced by a blow. D. E. H. CLEVELAND

Psychology

Psychiatric Study of Children with Pulmonary Tuberculosis. Dubo, S.: *Am. J. Orthopsychiat.*, **20:** 520, 1950.

Previous literature has indicated that emotional conflicts may contribute to the progression from latent infection to clinical tuberculosis in adults and may influence unfavourably the course of the disease. This study was focussed on the personality reactions of 25 children with tuberculosis who did not show common personality features in the pretuberculous state, although they had experienced common economic and social deprivations. They all tended to react to the illness with overwhelming anxiety, morbid preoccupations and fear of death. They tried to deny illness by overactivity and by conflicting identification reactions and projections of guilt feelings for being ill. These reactions seriously complicated the medical management, particularly the attempts to maintain rest. Psychotherapy is recommended as part of the treatment program and the hope is expressed that more awareness by the physician of the problems of the tuberculous child may help to improve the total care.
W. DONALD ROSS

A Study of Miners in Relation to the Accident Problem: 1. Psychiatric Evaluation. Hirschberg, J. C., Rogers, L., Stubblefield, R. L., Thaler, M., Princi, F. and Coleman, J. V.: *Am. J. Orthopsychiat.*, **20:** 552, 1950.

Psychiatric and psychological studies were done on ten accident-prone and ten non-accident prone workers in a Colorado mine. From these studies and from a review of the literature the following conclusions were reached: Accident proneness is a specific psychological response which will vary according to the current situations affecting certain personality trends. Accident proneness occurs with unconscious conflict with authority or with absence, failure, or loss, of dependency gratifications when deep hostility is coupled with great dependency needs in persons with an authority-hostility conflict.

Accidents may be unconsciously used to reduce guilt resulting from conflict with authority figures, and they may result from impulsive action taken because of hostility over authority. Certain defence mechanisms can be used by accident-prone persons to make accidents unnecessary, including projection and introjection. Adequate dependency gratifications can make accident proneness unnecessary for the handling of authority conflicts.

W. DONALD ROSS

Industrial Medicine

Psychological Procedures in the Selection of Factory Operatives. Porteous, W. S.: *Occup. Psychol.*, **24**: 113, 1950.

That psychological procedures can be applied in an industrial organization at operative level, provided sufficient attention is paid in their design to considerations of administrative convenience and candidate acceptability, is indicated in this article. The author who is chief industrial psychologist at the Cocoa Works, York, England, describes the psychological procedures in the selection of factory operatives, as followed in that plant.

The procedures have been designed to meet the requirements of selection in the engagement of new factory workers, in the placement of operatives in jobs vacant at the time of engagement, and in the promotion of factory operatives to the first stage of supervision. In all of these situations, three aids to selection are employed: biographical questionnaires for completion by the candidate; psychological tests of different kinds; and, a personal interview by a psychologist. The author gives details of each, explaining their method of use, their value and their relation to each other.

The biographical questionnaire is always the first step. It is designed to cover the applicant's background—education, occupation, recreation and social contacts. After completing it, the candidate takes the appropriate psychological tests. The ones used are intelligence tests, tests of attainment in English and arithmetic, and, specially designed aptitude tests. He is then interviewed by a psychologist who has before him the completed questionnaire. The importance of this interview is now well recognized. From the candidate's point of view it offers an opportunity to clarify, elaborate, excuse, what has been put on his form; from the interviewer's, it is the main source of evidence of any instability likely to limit the candidate's industrial usefulness. It provides for both candidate and interviewer an opportunity to agree upon the kind of work the candidate should do. The author cautions that the procedures adopted must fit into other programs in the company's personnel policy. For example, the selection procedure for new entries is only part of the engagement of a new employee. Candidates see three people—the employment manager, the doctor, and the psychologist, who must work hand in hand. Under this policy too, worker-management consultation is maintained at all levels. The psychologist therefore must be prepared to discuss his procedures with workers and their representatives.

Consideration must be given also to administrative convenience. The author discusses the problems which arise and shows how they met certain difficulties in a recent investigation.

MARGARET H. WILTON

OBITUARIES

AN APPRECIATION

Dr. O. W. Stewart

On September 26, the Canadian Army buried a doctor from Oklahoma who gave the finest possible service to Canada in World War II—Bill Stewart, or Major Stewart as his beloved patients called him in No. 1 Canadian Neurological Hospital at Basingstoke in England. Many of these sick boys in Basingstoke blue worshipped Dr. Stewart. They knew that his prime purpose in life was to get them well regardless of how much effort it cost him. No night was too long, no medical function too important to by-pass some sick lad who needed medical attention. Bill Stewart to me was one of the finest doctors I have ever known. The longer I worked in Basingstoke the more I admired him. Here was a rare mind whose diagnoses were sometimes brilliant; here was forthright honesty, as though it were blown direct from an Oklahoma plain. Withal there were his many Oklahoma sayings; he would often stay around a ward where a patient was critically ill because, he "was riding herd" for a while. When a conclusion was reached which surprised most of us, his saying, "hind sight is better than foresight" often kept our feet firmly on the ground.

Bill Stewart was a gift in many ways of the middle western United States to Canada. He had come east to Boston, following a not uncommon trend of middle western medical graduates. At the "M.G.H." he was intimately associated with Dr. Means of whom he talked frequently when we were discussing our heroes. Then he worked for a time with the beloved Dr. Mixter who sent him up for a time to the Montreal Neurological Institute. Here he quickly saw many advantages for further neurological surgical training and plunged into this postgraduate work with enthusiastic vigour.

When Canada entered the war, Bill had just completed a period in traumatic neurosurgery with Dr. Cone. After the formation of No. 1 Canadian Neurological Hospital he assisted in most of the cataloguing of surgical instruments which this unit required before going overseas. He was thus a member of that brilliant team of young people under the direction of Drs. Cone, Cross and Russel. During the next two years, he worked very closely with Dr. Cone when the hospital was permanently settled on Lord Camrose's estate at Basingstoke in Hampshire. Here was the foundation of that excellent meticulous surgery which he regularly carried out until the end of the war. That he overworked was axiomatic. In 1942 he had to be sent to Garnons, the Officers convalescent home for a rest, but back he came for a more intensive period of work. He carried on the Cone neurosurgical tradition after the latter was recalled to McGill, and from then to the end of the war at No. 1 Canadian Neurological Hospital. With the exception of two periods, one in charge of Neurosurgery at Queen Elizabeth Hospital in Birmingham, and the other a study leave at home, he persisted in rendering countless surgical benefits to almost irretrievable injuries. His account to the Royal Society of Medicine on contrecoup temporal lobe explosions in relatively severe head injuries is a slight memoir of this epoch. A few months after D-day when the British Society of Neurological Surgeons (to which he was elected) met at Basingstoke, his excellent contribution dealing with gunshot wounds affecting the cranio-facial orbital structures was extremely well received. It illustrates the development of his own surgical skill.

He must have been aware of the evil in his chest. Good clinician that he was, he must have known, but he was determined to see the thing through to the end. Then, just before victory in Europe, in May, 1945, he could not carry on further and had to report sick. His tuberculosis by then was serious indeed. Nevertheless he surmounted one personal medical challenge after another, the like that often happens to a sick doctor—especially the good ones. Finally the end came suddenly—5 years after his peak. He is buried in the soldiers' cemetery in Mount Royal in the land of his choosing. To me this was a hero's burial; one of the unsung heroes of World War II.

HAROLD ELLIOTT

BILL STEWART AS STUDENT, PATIENT AND FRIEND

While I was Dean of the University of Oklahoma School of Medicine a young chap from Muskogee Oklahoma was placed under my care because there was a question as to whether or not he was physically qualified for such an exacting task as medical education, and because of my friendship for his remarkable father and mother. While there was something in his appearance

and his personality peculiarly ethereal, it was obvious that his feet were on terra firma. During his second year in school, he developed pulmonary tuberculosis. He was placed in the sanatorium where he remained until his trouble was well under control. When he was convalescent we made rounds together and planned special studies and statistical records which he could further pursue while resting. His disease promptly responded to artificial pneumothorax. He had learned much about the management of tuberculosis and could be trusted to watch his step. Because he was an educated patient in every sense and because of satisfactory response to treatment, after one year he was permitted to return to school with the understanding that he would continue to live in the sanatorium where his physical well-being could be guarded and our mutual studies continued. As has already been mentioned, he joined the Canadian neurosurgical unit and went overseas as a medical officer in the service of the Canadian Army.

His sincerity, his appreciation, his loyalty, his industry and his enthusiasm for his chosen work were unfailing. Modest, but decided manifestations of his soaring genius appeared in his letters which came regularly until the war brought about an exacerbation of his disease and ended his brilliant career. His work with the No. 1 Canadian Neurological Hospital has been admirably reported by Dr. Harold Elliott. LEWIS J. MOORMAN

Dr. Herbert Russell Baines, aged 57 of North Battleford, Sask., died in a Saskatoon hospital on October 19. Dr. Baines was formerly on the staff of the provincial hospital at North Battleford, and had been ill for about three years. He is survived by his widow.

Dr. Wallace Balfour, aged 66, medical officer on the staff of the Ontario Workmen's Compensation Board for the last four years, died October 4. He is survived by his widow and a son.

Dr. John Brown, practising physician in Vancouver for 40 years died October 15 in Shaughnessy Hospital at the age of 82. Dr. Brown was born in Peterborough, Ont., came to Vancouver in 1910 and maintained an active practice on the West Coast until retirement three years ago. At the close of the First World War in which he served, he joined the staff of Shaughnessy Hospital. Later he moved to Vancouver Island where he practised at Sooke and later at Bralorne. He is survived by his widow and two daughters.

Dr. Arthur Carnel died at the General Hospital, St. John's, Nfld., on October 2. He graduated from McGill University, Montreal in 1911. Dr. Carnell was a member of the rugby team of McGill College, and was fond of the rod and gun in his early years. As a physician he answered many a call from long distances facing roughest snowstorms and heavy seas.

He had a large practice as a family physician. He is survived by his widow and three daughters.

Dr. Howard Coulthard, aged 70, died on October 24 at Toronto General Hospital, from a coronary thrombosis. He was born in Picton. He received his education in Picton and Toronto, and in 1905 graduated in medicine from the University of Toronto. Later, he became ship's surgeon on the *S.S. Empress of Japan*, after which he established a practice in British Columbia. At the outbreak of the First World War he joined the R.C.A.M.C. Transferred to the Imperial Army, he served overseas until 1918. Appointed to the Ministry of Pensions in London, England, he eventually became chairman of the officers' board, an office he held for four years. Relinquishing this appointment, Dr. Coulthard engaged in private practice in London for 26 years, retiring because of ill health. For 14 years a resident of Roehampton, London, he served for some time as warden of Holy Trinity Church. Dr. Coulthard was a member of the Alpha Delta Phi Fraternity. Keenly interested in outdoor life and winter sports, he was active in skiing. He was unmarried.

Le Dr Stanislas Daviault est décédé le 10 octobre, à l'Hôpital Général de Verdun. Né à Berthierville, le Dr Daviault, fit ses études classiques au Séminaire de Joliette. Docteur en médecine de l'Université Laval, de Montréal, en 1918, il exerça sa profession à Montréal durant trente-et-un ans. Il faisait partie du Bureau médical de l'Hôpital Général de Verdun, dont il était gouverneur. Lui survivent son épouse.

Dr. Charles L. Dixon of Renton, Washington, died following injuries received in a car accident on October 18. He practised medicine in Amherst, N.S. prior to taking up residence in the United States some 50 years ago. He is survived by his widow.

Dr. William John Fletcher died on October 15 at his home, 29 Larkin Ave., Toronto. He was in his 91st year and had been in ill health for several years. Dr. Fletcher was born in London, Eng., and came to Canada as a boy. He graduated from Collingwood High School and Toronto Normal School and taught for a few years. In 1890 he graduated in medicine from Trinity University and established a practice in Toronto, retiring in 1932. For some years Dr. Fletcher served on the staff of Toronto Western Hospital as head of the Department of Obstetrics. His wife died in 1936. He leaves one daughter and two sons.

Dr. Frank D. Graham died in England on October 17. He was in his 58th year. Born in Ottawa, Dr. Graham was educated at Ashbury College, Queen's University, and Manitoba College where he received his medical degree. During World War I he went overseas as medical officer of the First Depot Battalion of Vancouver. In 1918, he transferred to the Imperial Army and served nine years in India. He then returned to England and resumed his practice.

Dr. J. D. Grieve, psychiatrist at the Ontario Hospital in Hamilton, and a member of the extra-mural staff of the Brant County Health Unit, was killed almost instantly in a highway accident on October 17. Dr. Grieve, who was 43 years old, graduated from the University of Western Ontario in 1929 and served at the Ontario Hospital in London, Orillia, Mimico and Whitby before joining the Royal Canadian Army Medical Corps in 1943.

Dr. John Maxwell McDougall, aged 40, superintendent of Brant Sanatorium, died on October 26, in Brantford General Hospital. Born at Acton, he was a member of the staff of Mountain Sanatorium at Hamilton before going to Brantford. Surviving are his widow, two sons and one daughter.

Dr. Wallace Balfour Seaton, aged 62, for 27 years chief medical examiner for the Toronto district Board of Pension Commissioners, died at his home, 141 Inglewood Dr. on October 5. He was known to thousands of veterans of World War I, and in 1946 was awarded the O.B.E.. For the past four years he had been medical officer of the Workmen's Compensation Board. Born at Fort Erie, he was graduate of Welland High School and the University of Toronto School of Medicine. Dr. Seaton practiced for a time in Clifford after his graduation in 1913. He joined the R.C.A.M.C. in 1914 and was posted to the Imperial Army, serving throughout World War I in various field ambulance units in France and Belgium, with the rank of major. Survivors include his widow and a son.

Dr. Ivan W. Sneath, aged 34, of Regina, died on September 26 in General Hospital as a result of injuries sustained in an automobile accident. Born in Regina, Dr. Sneath attended Central Collegiate and Regina College. He received his medical training at the University of Southern California and the University of Manitoba, graduating from the latter in 1948. He then interned at Regina General Hospital before joining the Royal Canadian Army Medical Corps in 1944. Discharged from the

army with the rank of Captain in 1946, he practiced medicine at Pine Falls and Lac du Bonnet, Man., until the spring of this year. He returned to Regina to join the staff of General Hospital for further training in medicine. Surviving are his widow and one daughter.

Dr. Harold White, aged 73, died at Vancouver on September 16. Deceased, for 22 years director of General Health Services for the Metropolitan Health Committee, Vancouver, graduated from McGill in 1906. He practised in Moose Jaw and Watrous, Sask., before enlisting in the R.C.A.M.C., to serve overseas during the years 1915-18. Surviving are his widow and three daughters.

NEWS ITEMS

Alberta

Attending the American College Meetings in the United States during October, there were eighteen Fellows from Alberta. These men will speak at the local medical societies throughout the province reviewing some of the papers presented.

Dr. Walter C. MacKenzie has been appointed Professor of Surgery at the University of Alberta following the retirement from the chair by Dr. H. H. Hepburn. Dr. Hepburn will continue as head of the neurosurgical department. Dr. Mackenzie is a graduate from Dalhousie University. Following his postgraduate work at the Mayo Clinic he commenced practice in Edmonton. He holds the degrees of F.R.C.S.[C.], and the F.A.C.S. and is a Diplomate of the American College of Surgeons. During the last war Dr. Mackenzie served in the Royal Canadian Navy being stationed in St. John's, Newfoundland, and in England.

Dr. G. R. Davison has been made Director of the Department of Tuberculosis for the province following the retirement of Dr. A. H. Baker who held this position for many years and who gave such worthy service in building up the excellent service in this province; we wish Dr. Baker many more years of good health and useful advice from his long experience with tuberculosis.

W. CARLETON WHITESIDE

British Columbia

The recent death of Dr. A. B. Schinbein of Vancouver deprives the profession of a very distinguished surgeon, and the community of a man who has rendered notable public service. He had practised in Vancouver for some forty years, was chief of the Surgical Staff of the Vancouver General Hospital for a long time, and was Chief of Surgery at Shaughnessy Hospital, also for many years.

Dr. Schinbein was a Past President of the Vancouver Medical Association, was on the Senate of the University of British Columbia, was a Regent of the American College of Surgeons, and a Fellow of the Royal College of Surgeons of Canada. For services rendered between the two Great Wars, in the first of which he served in the Forces, he was awarded the Order of the British Empire.

Dr. Donald H. Williams of Vancouver has been appointed a member of the List of Medical Experts of the World Health Organization, whose headquarters are at Geneva. He will serve on the Committee on Treponematosis and Venereal Infection.

The new wing of the Rehabilitation Centre in Vancouver was opened at the end of October by Hon. Clarence Wallace, Lieutenant-Governor of B.C. This is the latest addition to this centre, which was built two years ago, for the training and rehabilitation of sufferers from spastic diseases and polio, under the sponsorship of the Western Society for Physical Rehabilitation. A great part in the financing of the original buildings was played by the Kinsmen's Club of Vancouver. The new wing was erected at a cost of $175,000—all of this having been raised by private subscription. It includes a large swimming pool, additional bedrooms and bathrooms, and other modern conveniences and equipment for the use of patients. In opening the unit, the Lieutenant paid a well-deserved tribute to the work of Dr. G. F. Strong, Vice-President of the Society, who has been a most active leader in the plans which have resulted in this achievement.

Mr. D. Andrews, President of Creston Valley Hospital Board, announces the recent gift of a complete x-ray equipment to the hospital. This is designed for examination of patients with a view to the detection of tuberculosis.

In the field of dental health in children, we note that a children's dental clinic has recently been established at Terrace. The clinic has just completed its first month's work, and reports a registration of fifty children. This clinic is supported financially by Parent-Teacher groups, the Canadian Legion and other organizations.

As the result of some two years of work and planning, the British Columbia Medico-Legal Society has recently come into being. This society has been formed to study medico-legal problems, and to afford time and opportunity for such study by medical and legal men, who are especially interested in these matters. The first President of the new Society is Dr. J. C. Thomas of Vancouver, and it is fitting that he should be the first incumbent, as he first introduced the idea, and has worked hard to make it a practical reality. Since he himself is a psychiatrist, he is especially concerned with the problems, of a medico-legal nature, that are constantly arising in his work—but the scope of the new Society's studies will not be limited to any one field. We believe that there is only one other similar society in Canada. The other officers of the Society are: Mr. Walter S. Owen, K.C., Vice-President; Mr. A. Hugo Ray, barrister, Secretary; Dr. J. R. Naden, Treasurer.

Lieut.-Col. F. H. Bonnell, R.C.A.M.C. of Victoria, has recently returned from Washington, D.C., where he attended a course on medical aspects of nuclear energy. He has been giving lectures since his return, on this subject.

At its Annual Meeting recently, the B.C. Cancer Institute, whose headquarters are at 685 West 11th Avenue, Vancouver, announced the practical completion of plans for the building of a large addition to its present establishment. The new buildings will cost some half-million dollars, and it is expected that they will more than double the efficiency of the Institute. Considerable help is being given in this project by both the Federal and Provincial Governments. Dr. Maxwell Evans, Medical Director of the Institute, has been away for some time, studying the latest advances in this field, and this addition will afford opportunity for the installation of more of the newest equipment. The new officers of the Institute are: Mr. A. H. Williamson, President; Mr. A. C. Turner, Vice-President; R. R. Arkell, Honorary Secretary.

The B.C. Medical Association has been sending medical teams to the various districts in the Province, as has been its custom for years. One of the most recent was that sent to Prince Rupert in October. The sessions were held at the Prince Rupert General Hospital, and were largely attended.

These meetings have two main functions—one being the presentation of scientific papers—and here addresses were given by Dr. Peter Lehmann, neuro-surgeon of Vancouver, and Dr. D. M. Whitelaw, medical internist,

also of Vancouver. These were excellent and most helpful. The other function is the furtherance of medical organization and unity. The economic questions which concern medical men receive attention here—and to represent this side of Association activity, Dr. S. A. Wallace of Kamloops, President of the B.C. Division of the Canadian Medical Association, addressed the gathering. He was ably seconded by Dr. Lynn Gunn, our Executive Secretary. J. H. MACDERMOT

Manitoba

Dr. W. T. Dingle, Winnipeg radiologist, with his wife and two sons, sailed on the *Empress of Scotland* on November 3 from Quebec. Dr. Dingle will spend the next year studying x-ray work in London, England.

Dr. J. L. Downey, head of Winnipeg's municipal hospitals, speaking to the Manitoba Druggists Association stated that the tuberculosis rate for Winnipeg was 9 cases per 100,000 of the population. This compares favorably with the average for Canada which is 30.1 per 100,000.

Dr. I. N. R. Scatliff, Baldur, Manitoba, and Dr. J. M. O'Keefe, Stonewall, Manitoba, have been awarded bursaries from national health grants which will give them a year's course in public health at the University of Toronto. Dr. E. H. Dobbs, assistant surgeon at Ninette sanatorium was granted a bursary for a short course in bronchoscopy at the University of Illinois and Dr. Wallace Grant, Superintendent of Children's Hospital, Winnipeg, is to spend a year at the Child Study centre of Yale University. ROSS MITCHELL

New Brunswick

Dr. G. B. Peat, was presented the Legion Meritorious Service Medical for faithful and continuous service to the local and provincial branches of the Canadian Legion for the past twenty-two years.

Dr. Donald Thompson of Bathurst, represented the Canadian Medical Association at the World Medical Association at New York.

Dr. Leo. H. Killorn, has established a practise in McAdam, N.B. Dr. Killorn interned at the Metropolitan Hospital, Windsor, Ontario, and at the Saint John General Hospital.

The slate of officers for the N.B. Branch of the Defence Medical Association for 1950-51 is as follows: Hon., Pres., Dr. L. D. Densmore, M.C., President, Dr. R. F. Ingram, Vice-President, Dr. J. P. McInerney, Sec.-Treas., Dr. J. A. Melanson.

Dr. R. T. Hayes, of Saint John, attended the meeting of the American Academy of Otolaryngology at Chicago.

Dr. V. A. Snow, of Hampton, and Dr. J. K. Sullivan of Saint John spent some time recently in Montreal.

Dr. Robt. H. Chalmers, of the Fredericton clinic has completed a short course of special study of Cancer Diagnosis at the Memorial Hospital in New York.

The meeting of the American College of Surgeons at Boston, attracted many surgeons from New Brunswick. Among others, Dr. V. D. Davidson, Dr. O. B. Evans, and Dr. Frank Wanamaker of Saint John.

Dr. Malcolm Dockerty, Pathologist of the Mayo Clinic, was the special speaker at the October meeting of the Saint John Medical Society. His subject—"Tumours of the Ovary". Dr. Dockerty addressed medical gatherings in Prince Edward Island and Nova Scotia, before his visit to Saint John.

Hon. J. G. Boucher, Provincial Secretary-Treasurer has announced that the Province will pay the hospitals a grant in aid at the rate of fifty cents per patient day, beginning January 1, 1951. This step will almost double previous grants. A. S. KIRKLAND

Ontario

Dr. R. M. Wansborough has been appointed surgeon-in-chief to the Hospital for Sick Children. He graduated in 1924 and was appointed to the hospital surgical staff in 1928. He joined the Army in 1940 attaining the rank of lieutenant-colonel as a surgical specialist. He succeeds Dr. Arthur LeMesurier who will continue to act as consultant.

Dr. Keith J. R. Wightman has been appointed assistant professor of medicine in charge of therapeutics. He graduated from Toronto in 1937, was awarded the faculty of medicine gold medal and won a Battle proficiency scholarship, and an Ellen Mickle fellowship which enabled him to study for a year at Cambridge University. During the war he served with the Royal Canadian Army Medical Corps. Since his return he has been an attending physician at the Toronto General Hospital.

The late Lieut.-Col. John Bayne MacLean left a $100,000 legacy to the University of Western Ontario to set up an endowment fund, the net income from which is to establish a chair of health or preventive medicine in the name and in memory of the late Roman Catholic Bishop of London, Right Reverend Michael F. Fallon.

The Ontario Medical Association and the Medical Alumni Association, University of Toronto presented a five-day refresher course on the specialties relating to general practice at Sunnybrook Hospital in October: 323 doctors registered from all parts of the province.

The Essex County Medical Society and the Red Cross Society held an open evening at the new building of the Curative Workshop, Windsor, to demonstrate to the medical profession the type and value of the treatments given. There the doctors saw work in occupational therapy, physiotherapy, and in speech therapy as well as gymnasium exhibitions and swimming pool activities of the physically handicapped.

Dr. Eric A. Linell, president of the Toronto Academy of Medicine gave his inaugural address at the annual dinner meeting. His topic was Impressions of Medical Practice in Canada and England. He found the Canadian Medical Association meeting much harder work than the British and much less formal. At the B.M.A. which he attended at Liverpool the discussions were free, open and often vitriolic. The major dissatisfaction was that of the general practitioners, tired men, hopelessly overworked, forced to send more and more of their patients to hospital for treatment of conditions which under happier conditions they could treat themselves. He was much impressed with the religious service always held at the beginning of the B.M.A. meeting, this year in Liverpool Cathedral. A similar service was held at the same time in the Roman Catholic Cathedral.

Dr. Linnell said he came home less depressed than he expected to be. Some of the food stringencies are beginning to lighten. The younger generation looks better, physically, than it used to look. The extra care given to infants and children during the war is beginning to show results and he feels that if Providence will only allow the new generation to grow up reasonably unperturbed England will be herself again.

Mr. Vincent Massey has been made an Honorary Fellow of the Toronto Academy of Medicine.

Construction of the new Academy auditorium has begun. The cost of the building will be $170,000.

The Division of Tuberculosis Prevention of the Ontario Department of Health and the Ontario Tuberculosis Association co-operated in sending a railway coach last summer, complete with staff and equipment for giving chest x-rays, on a 2,500 mile trip, to northern communities accessible only by rail. The coach visited 41 places, such as Hawk Junction, Oba, Folyet, Hornpayne, Biscotasing, Missinabie and Gogama. The coach was supplied by the Ontario Northern Northland Railway and travelled free over the Canadian National, the Canadian Pacific and the Algoma Central Railroads. About 20,000 people took advantage of this service.

Preliminary figures supplied by the Dominion Bureau of Statistics show the tuberculosis death rate of Ontario for 1949 to be a record low of 15.6. Saskatchewan has the second lowest with a rate of 21.5 per 100,000 population.

Registration in the Faculty of Medicine, University of Toronto is 292 in the two premedical years, and 692 in the four medical years. Eleven are taking the course in Art as Applied to Medicine, 2 are proceeding to Bachelor of Science in Medicine, 14 are in the course leading to Diploma of Public Health, 8 are working toward a Diploma in Psychiatry, 3 to a Diploma in Radiology, 6 toward a Diploma in Medical Radiology. There are 71 graduate students. The course in Occupational and Physical Therapy has 213 students.

The registration branch at the city hall reported 1,979 births in Toronto in October, that is 277 more than in October, 1949.

The Canadian Hospital Association has announced plans for a two-year correspondence course for hospital administrators. The course will begin early in 1951. Between 40 and 50 administrators are expected to enroll the first year. Summer and winter sessions are scheduled, with the summer sessions of 3 to 5 weeks to be held on the University of Toronto campus. The winter sessions will consist of 12 to 14 written assignments based on directed reading and questions. Faculty for the course will be hospital administrators in local areas with visiting lecturers from United States and Canada. Annual operating costs are expected to be $20,000. Cost per student will range from $40 to $50, plus transportation and board during the summer course.

Dr. C. H. Best was recently elected to membership in the American Philosophical Society, in Philadelphia. Earlier this year he was elected a foreign associate of the United States National Academy of Sciences.

Dr. Hoyle Campbell, Toronto, was re-elected president of the Canadian Association of Occupational Therapy. Dr. Henry H. Kessler, Newark, N.J., addressing the Association said that the greatest disability the handicapped individual has to overcome is the attitude of the man on the street. Employers hate to have a cripple around but Dr. Kessler says he is constantly surprised by what crippled people do, they have so many capacities.

The five-year old World Medical Association held a meeting of Council in New York in October with Dr. T. C. Routley in the chair. The Association has almost completed its series of surveys on the availability of medical resources and doctors throughout the world. Pakistan with a population of more than 600 million people has only four medical schools and only one doctor for each 100,000 persons. India with 327 million people has less than one doctor for each 100,000 persons. The W.M.A. is helping these countries by sending out teachers; by bringing out young medical students to America for post-graduate courses and by sending out literature on the recent medical achievements of the western world. Dr. A. D. Kelly and Dr. H. S. Dunham attended the meeting as observers. Dr. Kelly then went on to Great Britain where he will spend six weeks studying the National Health Scheme. LILLIAN A. CHASE

Quebec

Le 22 octobre, le premier ministre de la province de Québec, l'honorable Maurice Duplessis a inauguré le nouveau sanatorium Saint Joseph à Rosemont. Ce sanatorium a pu être construit grâce aux octrois provinciaux et féderaux. Il comprend 522 lits. Parmi ceux qui ont assisté à l'inauguration, on remarquait: Monseigneur Paul-Emile Léger, archevêque de Montréal; le docteur Albini Paquette, ministre provincial de la santé; le maitre de Montréal, Monsieur Camillien Houde; le docteur Marcel Verschelden, directeur médical de la nouvelle institution et le docteur Gilbert Turner directeur médical de l'Hôpital Royal Victoria.

Au mois d'octobre, la Montreal Medico-chirurgical Society a tenu sa réunion annuelle d'automne. Environ 500 médecins, la plupart venant de Montréal, ont assisté à deux cents conférences et symposiums, dans divers hôpitaux de Montréal. Une grande partie de la convention porta sur l'emploi de la Cortisone et de l'ACTH en médecine et en chirurgie. Les Docteurs Rodney Maingot et Heneage Ogilvie, tous deux d'Angleterre étaient parmi les conférenciers invités.

Le nouveau conseil de la faculté de médecine de l'Université de Montréal est le suivant: le docteur Wilbrod Bonin, doyen; le docteur Roméo Pépin, vice-doyen; le docteur Jean-Luc Riopelle, sécrétaire.

Le professeur Hans Selye, directeur de l'Institut de Chirurgie et de Médecine expérimentales de l'université de Montréal est revenu récemment d'un voyage de quelques mois en Europe et en Amérique du sud où il a donné une série de conférences et fut honoré par plusieurs universités et sociétés savantes.

Le docteur Gustave Gingras vient d'être élu membre de l'American Board of Physical Medicine and Rehabilitation et de l'American Society of Physical Medicine.

Le docteur Paul David, cardiologue à l'hôpital Notre-Dame vient d'arriver de Paris où il a assisté au 1er Congrès international de Médecine Interne et au Congrès international de Cardilogie.

Le professeur Jean Bernard, hématologiste français de renom, a donné récemment à l'hôpital St-Luc de Montréal, une série de cours portant sur les principles maladies du sang. YVES PRÉVOST

Dr. Charles Simard, director of the Cancer Institute in Montreal, was presented, on October 15, with the medal of l'Association Canadienne-Française pour l'Avancement des Sciences, a Quebec organization seeking scientific progress. Dr. Simard, a professor at the University of Montreal is the first physician to win the medal.

The Doctors' Hospital in Montreal announces an increase in its bed capacity from 25 to 45. There are 12 private rooms. The institution is open to all doctors in good standing. Medical staff meetings are held on Wednesdays for the discussion of cases.

Saskatchewan

The sod has been turned to commence the construction of a $1,000,000 School for Mental Defectives at Moose Jaw. For the past several years the school has been accommodated in Air Force buildings just outside of Weyburn and this new building will be their permanent home. The location is on the southern outskirts of the City of Moose Jaw.

We are sorry to report that Dr. B. C. Leech suffered painful injuries to his shoulder as a result of an automobile accident on his return from a hunting trip. The only consolation is that the hunting trip was most successful.

It is with regret that we have learned that Dr. John A. Valens has been confined to the Saskatoon City Hospital.

Dr. H. D. Dalgleish is welcomed home by his friends after a year in England doing postgraduate work in surgery.

Dr. E. Karpetz has resigned his practice at Spiritwood to enlist in the Special Service Force of the Canadian Army. He is now training at the R.C.A.M.C. School at Camp Borden. His practice at Spiritwood has been taken by Dr. I. Shwartz, M.D., Manitoba, 1950.

Dr. E. L. J. Smith has joined the Lloydminster Clinic and Dr. J. D. Stephen has arrived from England to take over the Pathology Department at Regina General Hospital.

Dr. J. W. Clark who practiced at Holdfast has moved to Qu'Appelle following Dr. H. D. McDonald who has joined Dr. A. J. McDougal in practice at Indian Head.

Dr. H. C. Carruthers who practiced at Lucky Lake has moved to Davidson.

Of the seven projected wings at the University Hospital at Saskatoon the excavation is complete and construction is in various stages in each wing. There is the empty excavation in one, poured concrete foundation in two, the steel is erected in two more, and the exterior is completed in those two wings adjacent to the Medical College Building. The field stone masonry matches the other University buildings.

G. GORDON FERGUSON

General

The following books by Canadian authors have been reviewed in the Journal during 1950.

Guide to Diagnosis of Occupational Diseases. Industrial Health Division, Department of National Health and Welfare, Ottawa, and the Division of Industrial Hygiene, Department of Health, Ontario (p. 201 August).

Secretory Mechanism of the Digestive Glands. B. P. Babkin, formerly Research Professor of Physiology, McGill University (p. 202 August).

Histology. A. W. Ham, Professor of Anatomy, in Charge of Histology in the Faculties of Medicine and Dentistry, University of Toronto (p. 200 August).

Diet Manual of the Montreal General Hospital. Compiled by the Committee on Hospital Diets (p. 200 August).

Textbook of Virology. A. J. Rhodes, Connaught Medical Research Laboratories and School of Hygiene, University of Toronto; and C. E. Van Rooyen, Connaught Medical Research Laboratories and School of Hygiene, University of Toronto (p. 206 August).

Clinical Nutrition. Edited by N. Jolliffe, F. F. Tisdall and P. R. Cannon (p. 424 October).

Origin of Medical Terms. H. A. Skinner, Professor of Anatomy, University of Western Ontario (p. 318 September).

The Practice of Medicine. J. C. Meakins, formerly Professor of Medicine and Director of the Department of Medicine, McGill University (Books Received p. 36 October).

Simmond's Disease, Extreme Insufficiency of the Adenophpophysis. R. F. Farquharson, Professor of Medicine and the Head of the Department, University of Toronto (Books Received p. 36 October).

Pavlov—A Biography. B. P. Babkin (Books Received p. 54 May, and specially noticed in December, 1949).

The Fifth Congress of the Pan-Pacific Surgical Association will be held in Honolulu November 19 - 21, 1951. The object of the Pan-Pacific Surgical Association is to bring together surgeons from countries bordering on the Pacific Ocean so as to permit the exchange of surgical ideas and methods and to develop a spirit of good fellowship among the various races represented. The Fifth Congress provides an opportunity for doctors to combine a delightful vacation in Hawaii with attendance at a scientific meeting, the program of which will be presented by topflight surgeons from the Pacific area countries, as planned by the program committee. Doctors are urged to bring their families with them and are promised luxurious accommodations. Further information may be obtained by writing the Pan-Pacific Surgical Association office, Suite 7, Young Building, Honolulu, T. H.

Candidates for the certificate of the American Board of Ophthalmology are accepted for examination on the evidence of a Written Qualifying Test. These Tests are held annually, in January, in various parts of the United States. *Applications are now being accepted* for the 1952 Written Test. Applications for the 1952 Written must be filed before July 1.—Secretary-Treasurer Edwin B. Dunphy, Boston, Executive Office: Cape Cottage, Maine.

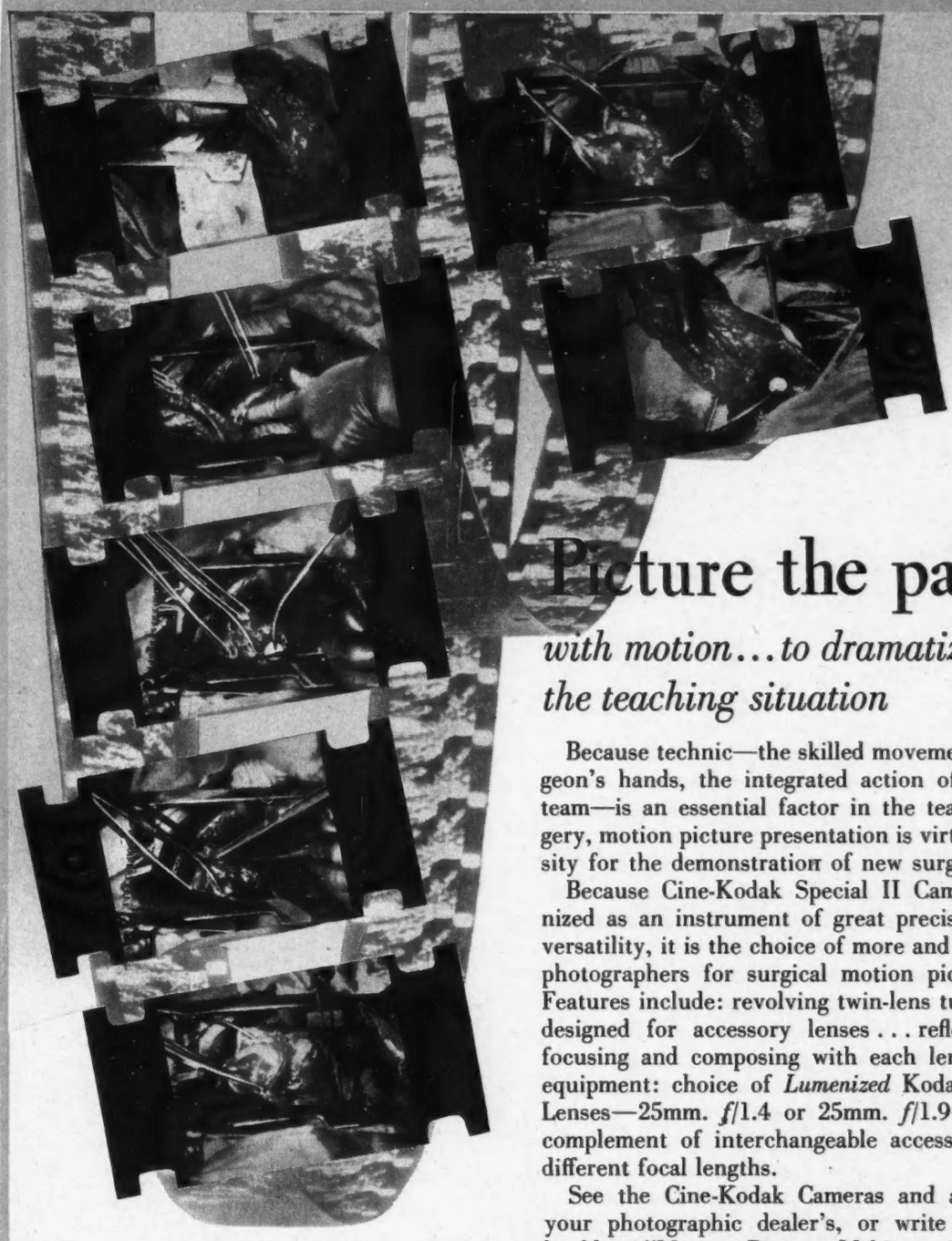
Book Reviews

Atlas of Human Anatomy. M. W. Woerdeman, Professor of Anatomy and Embryology and Director of the Department of Anatomy in the University of Amsterdam. 512 pp., illust. $15.75. Butterworth & Co. (Publishers), Ltd., London, England, 1948. Wetenschappelijke Uitgeverij, Amsterdam, 1948.

This is a most superior atlas of anatomy. In this first volume osteology, arthrology and myology are covered. While the order of presentation follows the systematic approach, which is somewhat unfavourable for anatomy courses on this continent, the plates are so good that this slim handicap is overshadowed. The drawings of bones and ligaments in the first two sections are not very different in technique and approach from those we have become accustomed to in the large standard works, but they are far more complete and better use is made of oblique views to highlight the details. The section on muscles is most interesting. It is introduced by a series of diagrams in which the muscles, in transparent red colour, are overlaid on bones; the latter being figured as they were in the preceding sections. The overall effect unites muscle and bone into a functional entity so that structural peculiarities of the bone become more understandable. We shall have to wait for the succeeding volume of the series before we can be sure that Dr. Woerdeman's new atlas can replace the older standard ones but judging by the present volume, the author has set a sufficiently high standard to turn the trick.

The Temporal Bone and the Ear. T. H. Bast, Professor of Anatomy, University of Wisconsin, Madison, Wisconsin; and B. J. Anson, Professor of Anatomy, Northwestern University Medical School, Chicago, Illinois. 478 pp., illust. $12.00. Charles C. Thomas, Springfield, Ill., 1949.

During the past two decades the authors and their associates, (including Dr. J. Gordon Wilson), have published many articles dealing with their original work on the temporal bone. These have been collected and with well-chosen references to the work of others, form the basic structure of this monograph on the developmental anatomy of the temporal bone and the ear. The more descriptive terminology, advocated by G. L. Streeter in 1918, is explained and used throughout the text. For example, the terms otic fluid and otic labyrinth are used instead of endolymph and membranous labyrinth. All portions of the temporal bone and the ear are reviewed but controversial points and new concepts form the bulk of the text. The arguments of the authors are supported



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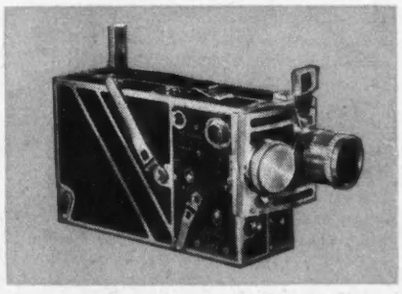

Kodak products for the medical profession include:

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by a large number of illustrations, including carefully made drawings of reconstructions, actual photographs and Edinger tracings. Such pathology as is relevant to the development of the temporal bone is included. The concluding chapter is devoted to the various theories on the structure and functions of the internal ear. This book should be of interest to all otologists and anatomists. However, it is not, and it does not profess to be, a text for teaching the anatomy of this complicated region, but it will probably have much to do with changing many erroneous, stereotyped passages often found in such textbooks.

Communicable Diseases. Edited by R. L. Pullen, Professor of Graduate Medicine, Director of the Division of Graduate Medicine, and Vice-Dean of the School of Medicine, Tulane University of Louisiana. 1035 pp., illust. $24.00. Lea & Febiger, Philadelphia; Macmillan Co. of Canada Ltd., Toronto, 1950.

There are some who hold that the fate of a book rests in its genetic factors and is wholly independent of natal environment. Such believers may be comforted to learn that this book has 52 contributors in addition to the editor, over 1,000 pages, 253 figures and 53 illustrations on 20 coloured plates. The clinical information comes largely from the wards and out-patient department of the Charity Hospital of Louisiana at New Orleans where clinical material is neither scanty in amount nor lacking in variety. The editor, as well as several of his collaborators, are on the Medical staff of Tulane University and all contributors have some claim to recognition in the world of medical science. These are impressive origins but they in no way lessen the merits of this excellent work. There is detectable throughout a sort of utilitarian bias which, as the editor almost apologetically explains, is the result of trying to put himself in the position of that possibly rare entity, the intern who is in doubt about the diagnosis when a patient is being admitted to hospital because of suspected or indeterminate communicable disease. By editorial skill the numerous contributions have been so unified that there is little overlapping while a firm restraint seems to have been exercised against any tendency to roam into theory or to drift into irrelevancy.

A carping reviewer can find several things which he himself would have done differently—had he been able to do them at all. Faults of this kind can be found in any form of pioneering and in many ways this book is breaking new ground. Further experience and experiment may change some of the classifications but the ones here given serve well for trail blazing. All in all it is a book which may be recommended to medical students, graduate and undergraduate, with little or no reservations.

Modern Practice in Dermatology, 1950. Edited by G. B. Mitchell-Heggs, Physician-in-charge Skin Department, St. Mary's Hospital and Medical School, London. 836 pp., illust. $15.75. Butterworth & Co. (Publishers) Ltd., London, 1950.

As the author states in his foreword, this book is essentially a symposium by a large number of authors from teaching schools of the British Commonwealth, mainly, Great Britain. An attempt has been made to describe those conditions which are common problems in general practice, industry and public health. Much of what is rare has either not been described or only briefly mentioned. The every day subjects are discussed in detail, especially their practical handling. Pathology is only briefly discussed. Debatable matter is kept to a minimum. For bibliography, the reader will have to have recourse to the various textbooks or journals.

The readers will find a practical grouping of disorders into chapters based on a common cause as well as those based on a particular region of the body. This arrangement is particularly helpful to the student and general practitioner. American thought for the most part is not yet ready to go as far as the British authors in their views on the emotional aspects of dermatology. This phase is strongly emphasized. One chapter is entirely devoted to it. Whatever one's personal views, its importance cannot be over-emphasized.

The photographs, of which there are 319 black and white and 7 coloured, are beautifully illustrative and the clearest and the sharpest this reviewer has ever noted in a textbook.

For the purpose for which this book is intended, its use by the student, the general practitioner, the specialist in fields other than dermatology, the authors have achieved their aim. The specialist in dermatology will enjoy reading it for its British point of view. The reviewer cannot recommend it too highly.

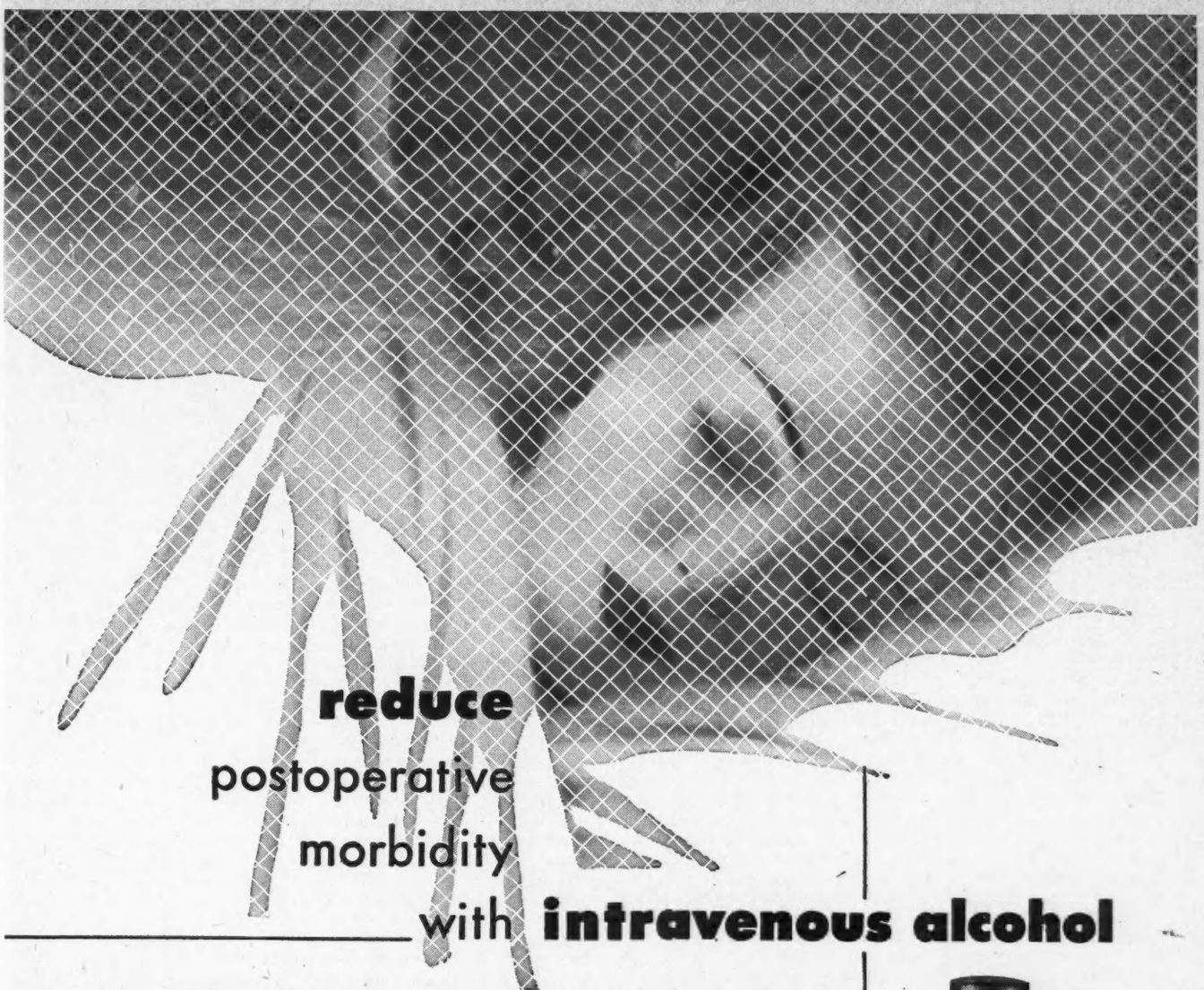
Regional Dermatologic Diagnosis: A Practical System of Dermatology for the Non-specialist. E. Epstein, Consultant in Dermatology and Syphilology to the Oakland Area Veterans' Hospital and Mt. Zion Hospital. 328 pp., illust. $7.20. Lea & Febiger, Philadelphia; Macmillan Co. of Canada Ltd., Toronto, 1950.

Nearly all the larger textbooks on dermatology have devoted a few paragraphs or pages to the regional distribution of skin diseases, emphasizing the matter of predilection of certain diseases for special regions as, for instance, that of psoriasis for the knees, elbows and extensor surfaces, acne for face and thoracic walls, and so on. Epstein has attempted in this book what at least one writer of a large book has stated to be impossible. He has divided the somatic surface into a number of arbitrarily defined areas and mentioned briefly the diseases which appear most commonly in that area, or for which that area is a site of predilection, and special peculiarities which a disease may exhibit in the various sites. His list confines itself to a relatively small number of diseases, and there is of course some overlapping. Although the title indicates that the book concerns itself only with diagnosis based on regional distribution a good deal of therapeutic comment is added. This also would seem well-nigh unavoidable. The busy general practitioner not only wants a book that will give him some quick help in diagnosis—and the numerous excellent illustrations will do much to augment this—but he will naturally want to know what, if anything, he can do for the patient's relief. In general the therapeutic advice is good and in places it excels in clarity, but there is too much reference to the use of x-ray therapy. A word of warning in this regard appears here and there, but can readily be missed; the casual reader is apt to carry away the idea that x-ray therapy is the best treatment for nearly all skin diseases, and may attempt to bend his diagnostic equipment to the task or refer his patient to a general radiologist who is without dermatological knowledge or experience. Such a remark as "x-ray therapy is valuable but must be used with caution" (referring to seborrhœic dermatitis) is not forcible or explicit enough.

The book should be useful to the general practitioner for the purpose already referred to, but certain faults of production cannot be overlooked. There is evidence of hurried workmanship, shown in occasional ambiguities, grammatical and orthographic solecisms. A thorough polishing before the next edition appears may not add greatly to the practical value of the book but the text will be more pleasing to the critical eye. The book is recommended to the non-specialist.

Non-gonococcal Urethritis. A. H. Harkness, Joint Director of the Endell Street Clinic, St. Peters and St. Paul's Hospitals (Institute of Urology). 424 pp., illust. $10.00. E. & S. Livingstone Ltd., Edinburgh; Macmillan Co. of Canada Ltd., Toronto, 1950.

There are relatively few people who are qualified to write on this subject, and of these Mr. Harkness is certainly outstanding. His book is a masterpiece of careful writing and considered opinion. Each chapter discusses in detail, the cause, the diagnosis of, and the treatment of one individual type of urethritis. The con-



reduce postoperative morbidity with intravenous alcohol

Quiet, restful sleep following surgery may be easily induced by the use of intravenous alcohol as a sedative and analgesic.[1] Cough, gas pains, urinary retention, vomiting, and fever are materially reduced when alcohol is used to decrease or eliminate the use of morphine.[2,3]

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clusion is inescapable that to simply apply the broad term non-gonococcal urethritis without endeavouring to identify the positive organism or parasite is quite unacceptable in the face of modern knowledge. Mr. Harkness has gone to considerable care to indicate how one may arrive at an accurate diagnosis, and to show that a successful therapy depends upon such accuracy. The chapter on traumatic urethritis both chemical and mechanical emphasizes a truth which most practitioners would be happy to overlook, namely, in a certain percentage of cases, the urethritis is maintained by overtreatment.

The reviewer regards this book as being of the greatest value to all practitioners regardless of whether they are doing general practice or specializing in some branch of medicine or surgery, as almost everyone is encountering just such type of infections today. This book is highly recommended to both the general practitioners and specialists and should be of very real value to the student in medicine who is given very little accurate information on this common disease.

Postgraduate Obstetrics and Gynæcology. F. J. Browne, Emeritus Professor of Obstetrics and Gynæcology, University of London. 501 pp., illust. Butterworth & Co. (Publishers) Ltd., London, 1950.

This book, as the title indicates, has been written primarily for the postgraduate student, and will appeal to those preparing for fellowship examinations. The main emphasis is on gynæcology, as the author has covered most obstetrical subjects in a previous book, Antenatal and Postnatal Care. There is an excellent chapter on tuberculosis of the genital tract, a disease not found so frequently on this continent. His chapter on the physiology and pathology of lactation is a welcome addition to an obstetrical text, is clear and concise, as is the chapter on the etiology of toxæmias of late pregnancy, always a difficult and controversial subject. Abnormal uterine action is described well, and will clarify the thoughts of many readers regarding its causes and treatment. The surgical treatment of carcinoma of the cervix has not been described as fully as one might expect, from recent trends. This is an outstanding book, and is recommended not only for the postgraduate student, but for the specialist in the field of obstetrics and gynæcology, as well.

Office Orthopædics. L. Cozen, Attending Orthopædic Staff, The Orthopædic Hospital, Veterans' Hospital, Los Angeles. 232 pp., illust. $6.00. Lea & Febiger, Philadelphia; Macmillan Co. of Canada, Toronto, 1950.

The author, in his preface, states that he has attempted to describe what is done in an orthopædist's office or in an orthopædic clinic with emphasis on the procedures employed in ambulatory orthopædics. Although some useful suggestions are given on the treatment of foot disorders it is not felt that this book will be of much value to the general practitioner, for whom it is written, as it is for the most part, lacking in specific detailed information. Only thirteen pages, half of which are illustrations, are devoted to the ambulatory treatment of fractures, a subject which certainly merits more extensive discussion. A minor annoyance is the failure, on several occasions, of a reference in the text to indicate the correct figure, and the final criticism is that the book is inexpertly written.

Cytologic Diagnosis of Lung Cancer. S. M. Farber, M. Rosenthal, E. F. Alston, M. A. Benioff, A. K. McGrath, from the University of California Medical Service. 79 pp., illust. $2.75. Charles C. Thomas, Springfield, Illinois; The Ryerson Press, Toronto, 1950.

This monograph will be of particular interest to the pathologist who is interested in chest disease. It is primarily of value for its chapters on the distinguishing characteristics of benign and malignant cells; and for its fine series of colour plates which illustrate the appearance of these cells in prepared sputum. Examination of the sputum for malignant cells is an accessory means of investigation of carcinoma of the lung which, in its place, is a valuable adjunct to the previously established methods of diagnosis. There is a justifiably strong warning given in the text which stresses the essential need for considerable experience with the cytology of cells in sputum before making a positive diagnosis. Providing one is prepared to spend the necessary time and effort in becoming adept at this procedure, it will form a valuable part of the investigation of carcinoma of the lung.

Cum Notitia. Reminiscences of a General Medical Practitioner. D. A. Alexander. 395 pp. $2.40. John Wright & Sons Ltd., Bristol; Macmillan Co. of Canada Ltd., Toronto, 1949.

This practitioner in rural England entered upon the practice of medicine at the close of the last century. He was a link between the days of medical apprenticeship and the era of aseptic surgery and chemotherapeutics. Dr. Alexander has left a valuable record of the memorabilia of his years in practice. It was written at different times during his active years and the literary quality varies somewhat. From the early expansion of the medical and scientific horizon at the beginning of this century to the more conservative and less elastic outlook of the man of advancing years, he faced the final chapter with the results of fifty years of research to sustain his professional interest. His rural surroundings occupied his attention and his speculative outlook is comprehensive enough to include patients, the pastoral life, the hereafter and medical research. Included in his book are many prescriptions and modes of treatment which he had himself found useful. To the younger practitioner they may sometimes seem inadequate. There is, perhaps, a tendency to neglect some of the proved methods of other days. The author died before he could correct the proofs, and some oddities of expression which have escaped the blue pencil only add to the interest and obvious sincerity of the work.

Practical Neurological Diagnosis. R. G. Spurling, Clinical Professor of Surgery (Neurosurgery), University of Louisville School of Medicine, Louisville, Kentucky. 268 pp., illust., 4th ed. $6.00. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1950.

That this small volume is now in its fourth edition is sufficient recommendation. It is brief, well written. The addition of a glossary of terms is a welcome addition. For those interested in the nervous system this book will be a most useful volume.

Harvey Cushing. E. H. Thomson. 345 pp. $4.00. Henry Schuman, Inc., New York, 1950.

This second biography of Harvey Cushing follows the first, written by Dr. John F. Fulton, after an interval of five years. The purpose of the present volume is to make a comparatively short account of Cushing's life available to medical students and members of the medical profession with little leisure, as well as the lay reader. Cushing's full and, at times, tempestuous life makes ideal biographical material. He recorded events with care in diaries and letters in addition to his published technical and non-technical books and papers. Miss Thomson has made excellent use of this rich and abundant material. Her interest in books and, one may surmise, a woman's interpretation of human relations are reflected in the particularly interesting chapters dealing with Cushing as a collector of rare books and Cushing as "A Good Doctor", which portrays the close and long continued interest and affection which grew up between surgeon and patient.

The writing style is excellent. Illustrations, though few, have been well chosen, as have the quotations from Cushing's diaries and correspondence. Miss Thomson is to be congratulated on preparing an accurate and interesting account of the life and work of a great surgeon.

The book should be read especially, for its stimulating effect, by medical students and college students contemplating a career in medicine.

Practical Anatomy. W. E. Le Gros Clark, Professor of Anatomy in the University of Oxford Fellow of Hertford College. 493 pp., illust., 2nd ed. $5.75. Edward Arnold & Co., London; Macmillan Co. of Canada Ltd., Toronto, 1949.

The reviewer has had the privilege of recommending this little book as a dissecting manual for medical students for the past two years. The pressures of medical education and the consequent curtailment in time given to the teaching of anatomy make it necessary to use a brief dissecting manual such as this one. We have found that this book by Professor LeGros Clark works very well and is adaptable to almost any teaching schedule. The second edition is improved by new illustrations and considerable textual clarification in some areas which were formerly somewhat weak.

Principles of Ophthalmology. T. Henderson, Senior Surgeon Nottingham and Midland Eye Infirmary. 230 pp., illust. 20s. net. William Heinemann, Medical Books, Ltd., London, 1950.

Although this volume is not without interest, it is one of the most irritating books it has been our misfortune to read. In the first place, the author, who apparently considers himself an expert on terminology, has not properly entitled his book. Whereas it is called the "Principles of Ophthalmology", the first half is devoted to comparative anatomy of the eye. Even at that, it is not a complete account, but is largely a compilation of the author's own observations. There are many statements with which authorities will differ. Further, his loose terminology is confusing to the reader, as well as being inaccurate. Thus, he continually misuses the words "monkey" and "primates" (for example, on p. 8 he says, "In primates (monkeys and man) . . ."). Monkeys are not primates. Also, he uses numbers in reference to divergence without any indication as to whether they refer to degrees or some other angular measurement. His discussion is full of teleological phrasing which is most irritating and unscientific.

In the last half of the book the author deals with some topics which come under the heading of "Principles of Ophthalmology" in that he discusses accommodation, intraocular pressure, and glaucoma, but not enough topics are covered to warrant this title being given to the whole book. He continually digresses in tirades against other writers. In some cases these are quite personal, and destroy the dignity of the book. In supporting his own views he does not present sufficient data to give them weight. His ideas, however, are not without interest to the academic ophthalmologist to whom the reading of this volume will be of some value, but to the average ophthalmologist its greatest value will lie in seeing how a book should not be written.

William Withering of Birmingham. T. W. Peck and K. D. Wilkinson. 239 pp., ill. $4.00. John Wright & Sons Ltd., Bristol; Simkin Marshall Ltd., London; Macmillan Co. of Canada Ltd., Toronto, 1950.

This is a most interesting book, not only as a picture of the life of one of the outstanding figures in medical history but also because it presents as a background a great many well known persons of that time. It might almost be called an extra illustrated edition, because portraits and engravings of these figures and their surroundings appear in great profusion.

There are two sides to the presentation of Withering's life. The first, by Mr. T. W. Peck, covers in a most exhaustive way the historical background of the Withering family in Staffordshire. It represents the work of many years by a man skilled in genealogical research. To one interested in medical history and a general picture of the philosophic interests of his time, the actual life and times of Withering are presented extremely well by Dr. Wilkinson. Withering's activities as a physician are well known, but there is much new material about his skill as a botanist of the new school, as a chemist, and also as one engaged in manufacture. Amongst Withering's friends, we notice the names of Boulton and Watt, who introduced steam machinery into the industrial revolution of Britain, Josiah Wedgwood, the potter, Joseph Priestley, the discoverer of oxygen, to say nothing of Erasmus Darwin the grandfather of Charles Darwin. There is also a most interesting chapter on the great figures of the Edinburgh School of Medicine at the time when Withering was a student at that institution. Perhaps the new material in the book is centred in a considerable correspondence which took place between the Darwin family and Withering regarding the question of professional ethics. It shows clearly the feelings of antagonism which arose between two eminent provincial practitioners when they happened to invade each other's territory. There is a full description of the riots of 1791, during which the home of Priestley was destroyed, and much other damage done to property of persons whose beliefs were not regarded with favour at the time.

The book can be highly recommended to those having an interest in medical and social history.

Hæmolytic Disease of the Newborn. M. M. Pickles, Nuffield Graduate Assistant in Clinical Pathology, Radcliffe Infirmary, Oxford. 181 pp., illust. $6.50. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1949.

The author's stated purpose in this book is "to display the natural history and treatment of hæmolytic disease of the newborn and the relationship between the maternal immunization and the clinical and pathological changes in the child". The clinical material is based on a five year study of 73 families with 116 affected children. The details of the technical methods which have been adopted and proved to be reliable are also set out. There are chapters on all the aspects of Rh in relation to hæmolytic disease. Throughout the book the author gives extensive references to the literature on this subject. The complex and sometimes conflicting theories are given full mention. The practical aspects of the Rh problem are stressed and the book contains many practical suggestions especially with regard to treatment. This book should prove to be of great interest to all those who have to deal with this problem.

Medical Management of Gastrointestinal Disorders. G. Cheney, Clinical Professor of Medicine, Stanford University Medical School. 478 pp., illust. $6.75. The Year Book Publishers, Inc., Chicago, Ill., 1950.

This is another in a series of General Practice Manuals and is up to their usual high standard. It makes no pretence of being a textbook on gastroenterology, but presents a practical review of gastrointestinal disorders, with emphasis on clinical findings and differential diagnosis, and contains some good treatment suggestions. The book is sound, easily read and can be recommended to the busy practitioner.

Continued on page 58

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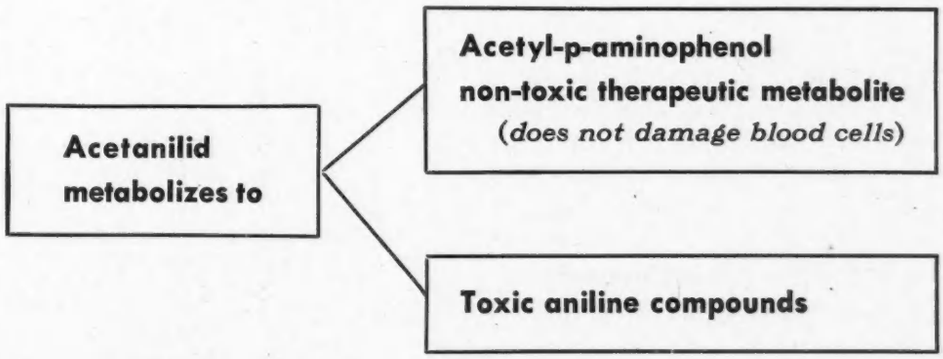

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Books Received

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Books are acknowledged as received, but in some cases reviews will also be made in later issues.

Physician's Handbook. M. A. Krupp, Assistant Clinical Professor of Medicine, Stanford University School of Medicine; N. J. Sweet, Assistant Professor of Medicine, University of California School of Medicine, San Francisco; E. Jawetz, Associate Professor of Bacteriology and Lecturer in Medicine and Pædiatrics, University of California School of Medicine; Charles D. Armstrong, Clinical Instructor in Medicine, Stanford University School of Medicine. 380 pp. $2.50. University Medical Publishers, California, 1950.

A Textbook of Venereal Diseases. R. R. Willcox, Consultant in Venereal Diseases, St. Mary's Hospital, London. 439 pp., illust. 32s. 6d. net. William Heinemann, Medical Books Ltd., London, 1950.

Plastic and Reconstructive Surgery—A Manual of Management. F. Smith, Consultant in Plastic Surgery, Blodgett Memorial Hospital, Grand Rapids, Michigan. 895 pp., illust. $17.50. W. B. Saunders Co., Philadelphia and London; McAinsh & Co. Ltd., Toronto, 1950.

Introduction to Motherhood. G. D. Read, 92 pp., illust. 6s. net. William Heinemann, Medical Books Ltd., London, 1950.

The Antihistamines: Their Clinical Application. S. M. Feinberg, Associate Professor of Medicine; S. Malkiel, Assistant Professor of Medicine; A. R. Feinberg, Clinical Assistant in Medicine, Northwestern University Medical School. 291 pp. $4.00. Year Book Publishers, Inc., Chicago, 1950.

Cell Physiology and Pharmacology. J. F. Daniell, Professor of Zoology, King's College, London, and Honorary Lecturer in Pharmacology, University College, London. 156 pp. $3.00. Elsevier Publishing Co., Inc., New York, Amsterdam, London and Brussels, 1950.

Atlas of Tumour Pathology. Prepared at the Armed Forces Institute of Pathology Under the Auspices of the Subcommittee on Oncology of the Committee on Pathology of the National Research Council. Section 2—Fascicle 6—Tumours of the Peripheral Nervous System: A. P. Stout, Professor of Surgery, Columbia University. 57 pp., illust. 60 cents. American Registry of Pathology, Armed Forces Institute of Pathology, Washington, 1950.

The Design of Toxicity Tests. W. L. M. Perry. Reports on Biological Standards: VI, 51 pp. 1s. 6d. Medical Research Council Special Report Series No. 270. His Majesty's Stationery Offce, London, 1950.

Essay on the Cerebral Cortex. G. Von Bonin, Professor of Anatomy, College of Medicine, University of Illinois, Chicago, Ill. 168 pp., illust. $5.00. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1950.

Cranioplasty. D. L. Reeves, Consultant in Neurological Surgery, Santa Barbara Cottage Hospital, Saint Francis Hospital, Santa Barbara General Hospital, Santa Barbara, California. 132 pp., illust. $4.00. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1950.

Clinical Applications of Suggestion and Hypnosis. W. T. Heron, Professor of Psychology, University of Minnesota. 116 pp. $3.50. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1950.

Enzymes, Growth and Cancer. V. R. Potter, Professor of Oncology, University of Wisconsin Medical School, Madison, Wisconsin. 64 pp. $2.50. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1950.

Types of Diabetes and Their Treatment. A. R. Colwell, Associate Professor of Medicine and Director of Medical Specialty Training, Northwestern University Medical School. 97 pp. $2.75. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1950.

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Books Received

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The Physiological Basis for Oxygen Therapy. J. H. Comroe, Professor of Physiology and Pharmacology, Graduate School of Medicine, University of Pennsylvania, and R. D. Dripps, Profesor of Anæsthesiology, University of Pennsylvania School of Medicine. 85 pp. $3.00. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1950.

Light Therapy. R. Kovacs, Professor of Physical Medicine, New York Polyclinic Medical School and Hospital. 112 pp., illust. $2.75. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1950.

Asphyxia Neonatorum—Its Relation to the Fetal Blood, Circulation and Respiration and its Effects upon the Brain. W. F. Windle, Professor of Anatomy and Chairman of the Department of Anatomy, School of Medicine of the University of Pennsylvania, Philadelphia, Penn. 70 pp., illust. $2.75. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1950.

Worth and Chavasse's Squint—the Binocular Reflexes and the Treatment of Strabismus. T. K. Lyle, Surgeon and Medical Officer in charge of the Orthoptic Department at the Westminster Branch of the Moorfields, Westminster and Central Eye Clinic. 319 pp., illust., 8th ed. $6.75. Baillière, Tindall & Cox, London; Macmillan Co. of Canada, Toronto, 1950.

Ophthalmic Operations. S. Philps, Surgeon-in-charge of the Eye Department, Saint Bartholomew's Hospital, London. 397 pp., illust. $9.50. Baillière, Tindall & Cox, London; Macmillan Co. of Canada Ltd., 1950.

Textbook of X-ray Diagnosis. By British Authors, In Four Volumes, Volume IV. Second Edition Edited by S. C. Shanks, Director, X-Ray Diagnostic Department, University College Hospital, London and P. Kerley, Director, X-Ray Department, Westminster Hospital, London. 592 pp., illust. $17.25. W. B. Saunders Co., Philadelphia and London; McAinsh & Co., Toronto, 1950.

Bone and Joint Diseases—Pathology Correlated with Roentgenological and Clinical Features. J. V. Luck, Assistant Clinical Professor of Orthopædic Surgery, University of Southern California. 614 pp., illust. $19.75. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1950.

Steroid Hormones and Tumours—Tumorigenic and Antitumorigenic Actions of Steroid Hormones and the Steroid Homeostasis Experimental Aspects. A. Lipschutz, formerly Professor of Physiology. 309 pp., illust. $6.75. The Williams & Wilkins Co., Baltimore, 1950.